PYRMONT,

ITS

CHALYBEATE AND SALINE SPRINGS

AND THE

COMPLAINTS ALLEVIATED BY THEIR USE.

BY

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LEIPZIG:

F. A. BROCKHAUS.

1864.

MOST RESPECTFULLY DEDICATED

TO

H. R. H. PRINCESS FRIEDRICH CARL OF PRUSSIA

BY

THE AUTHOR.

Preface.

Of all the publications on the Mineral Waters of Pyrmont, the following are, I believe, the only works written for the benefit of the English:

1) An Account of the Nature and excellent Properties and Vertues of the Pyrmont Waters. By F. Stare. London, 1717.
2) A brief and distinct Account of the Mineral Waters of Pyrmont. By George Turner. London, 1733.
3) A short Description of Pyrmont, with Observations on the Use of its Waters. By F. M. Mariard. London, 1778.
4) Medical Sketch of Pyrmont, the most ancient and celebrated Spa of Northern Germany. By R. Harnier. Frankfort, 1843.

Thus for full twenty years nothing has been done to call the attention of the medical men and the sick of England to the efficacy of the springs of Pyrmont for the most general complaints of our times, viz. *poorness of the blood*, the different long and wearisome *nervous disorders*, and *diseases affecting the sexual organs of females*. And yet in these very twenty years how have the improved means of communication everywhere facilitated the visiting, on the part of the English, of German

watering-places! That the English who resort to our springs are less numerous than the Russians, Poles, Swedes, Dutch, &c., must be ascribed solely to the circumstances, that the medical men of England are not sufficently aware of the great therapeutic qualities of our springs, and that the decidedly rare natural beauties of our mountain-bound valley have remained unknown to the English, who are by nature great lovers of such beauties.

To this reason for my publishing the following pages must be added another: The last twenty years have certainly not been the least fruitful with respect to physical science and medicine. Chemistry has made great progress; and the latest analyses of our Mineral Waters (which will be found on future pages) have naturally profited by this progress. The more accurate reseaches in pathology and therapeutics, together with a refined physiology, have more precisely defined the indications of the use of our spring; so that we can now decide with much greater certainly than formerly what classes of sufferers would be benefited thereby, and in what cases the waters would be of no avail or even downright injurious.

Finally, the researches of the last ten years — and among them I may mention my own* — have afforded us a better insight into the *way* in which these waters act.

Such were, in a few words, my reasons for publishing the following little treatise, which I herewith recommend to the kindness and indulgence of the Reader.

Pyrmont, 1864.

The Author.

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* Bad Pyrmont, Studien und Beobachtungen über die Wirkung seiner Brunnen und Bäder. Kiel, 1857.

CHAPTER I.

ON THE AGE AND HISTORY OF THE SPRINGS OF PYRMONT AND THE SITUATION AND CLIMATE OF THE PLACE.

Before I describe to the reader how, in the course of ages, our valley, so rich in mineral springs, rose to become a first-class watering-place, I shall take the liberty of briefly mentioning an event in the history of the world connected with the neighbourhood of Pyrmont. I mean the three days' struggle between Herrmann and Varus, which terminated in the defeat of the latter and the liberation of Germany from the Roman yoke, 9 A. D. In all probability the castle of the deliverer of Germany was situated on a mountain, 1,100 feet high, about $4^3/_4$ miles from Pyrmont, still called the Herrmannsberg (Hermann's Mountain); and, to the present day many spots in the neighbourhood bear names so significant of war, victory, the horrors of a battle, &c., that it can scarcely be doubted that the great battle alluded to was fought near Pyrmont. But, turning from this glorious event, we will endeavour to find an answer to the question, how far back we can

trace a knowledge of these Mineral Waters: and just at the time when I was engaged in writing these pages, chance threw a new light upon the matter, giving an answer to the question differing widely from the suppositions hitherto put forth. And it happened thus: Deep excavations, made in the course of the autumn and winter of 1863 for the purpose of newly enclosing the chalybeate springs, brought to light some highly interesting curiosities, which appear to prove beyond all doubt that already in the 3rd. century A. D. the springs of Pyrmont were frequented by numerous visitors, more perhaps out of veneration for the springs sacred to our forefathers than for the purpose of obtaining relief for the complaints of the body. On a spot several feet in circumference round the fallen trunk of a linden-tree were found the following productions of human industry: A round scoop-like vessel of gold-coloured bronze capable of containing about a pint, most artistically engraved, and enamelled with blue and grey — a vessel that had certainly been long in use, from the fact that the original bottom had been replaced by a new one cemented in; a round spoon, likewise of gold-coloured bronze; two wooden scoop-like vessels; some 200 breast-pins, and a good dozen of girdle buckles, some of bronze, some of copper wire; and finally two Roman coins, one of which is of silver and much defaced, probably by long use, and bears the bust of Domitian, with the inscription *Imp. Caes. Domitianus Aug. P. M.*, dating therefore from some period between 81 A.D. and 96 A.D.; the other is of bronze, with the inscription *M. Aur. Anton. Caes. Pontif*, and dates therefore from 167—174 A.D. I cannot better describe the suppositions and reflections

suggested by the finding of these objects than by quoting the words of the gentleman who had the direction of the works and made the discovery, Mr. Ludwig of Darmstadt. The following are his words on the subject:

"I am of opinion that in heathen antiquity the Pyrmont springs were considered sacred by the Teutons, and that sacred linden-trees were planted about them. The spot where the water wells up is to this day called the *Heiliger Anger (sacred ground)*, a name that has evidently come down to us from old times. The mineral spring of Pyrmont was called, as late as the 17th. century the *Hylliger Born (sacred spring)*; the present *Oesdorf* was formerly *Odisdorf;* and the present *Königsberg* (so named in honour of Frederic the Great) was called the *Odisberg.* Both these names indicate plainly that Odin (Woden) was formerly worshipped in the neighbourhood. Most likely a priest or priestess handed to those who approached to adore the divinity of the spring a drink of the water out of the richly ornamented vessel mentioned above, and laid down the offered sacrifices at the roots of the sacred linden-tree. The coins discovered are important because they prove that the other objects found must be least 1500 years old!"

Turning from these proofs of the existence of the Pyrmont springs some 1500 years ago, we light upon accounts stating that Charlemagne — who, in 784 A.D. established his winter-quarters in a little town (now Prussian) near Pyrmont, and who is said to have built the church of the Cross there standing, and which is visited by great numbers of foreigners — drunk of the

the Pyrmont springs, which is likely enough,although not proved beyond all doubt. The first reliable accounts date from the middle of the 14th. century. These springs were greatly renowned about the middle of the 16th. century; and of the year 1556, more especially, different accounts have come down to us. After a short period of decline prosperity returned, and in 1681 the season was the most glorious and flourishing of all, there not being less than thirty-five princely personages on the list of visitors; and even a Paris publication of the time spoke of "*ce qui s'est passé aux eaux de Pyrmont entre les vingt-sept Altesses qui s'y sont trouvées.*" The year 1716 was marked by the visits of Peter the Great and George I. of England. In 1744, 1745, and 1746 Pyrmont was honoured by the presence of Frederic the Great; and the Oesberg, where he is said to have drawn up the plan of the second Silesian war, was called, after him, the Königsberg, and a monument has been erected to him there. In 1796 and the following year Frederic William II. visited Pyrmont, and in 1806 the much-afflicted and greatly-beloved Louisa, queen of Prussia. A pleasing and noble feeling of veneration for this never-to-be-forgotten lady prompted her granddaughter, the reigning Grand-duchess of Baden, when on a visit to this place, where she found relief from its waters, to adorn the park grounds with a bust of her grandmother.

Different states of Germany combine to form a setting for the precious jewel, the little principality of Pyrmont. It is bounded by Hanover, Brunswick, Lippe and the small Prussian enclave Lügde. A most luxurious vegetation covers this little land, magnificent linden-trees, chesnuts and beeches adorn the valley and the neigh-

bouring mountains, such as few parts of Germany can show. More particulary beautiful are the avenues, and the park grounds, with their trees 200 years old; so that we may assert without boasting that no other of the many watering-places of Germany can compare therein with Pyrmont. The meadows bordering the little river Emmer, which winds through the valley, present to the eye a beautiful green that reminds one of the rich meadows and well-tended lawns of England. And all this is enclosed by mountains 1000 feet high and thickly covered with beech-trees, which shelter the valley from the rude north-east wind. Mountain and valley afford the most agreeable walks; the river invites the angler, and the wooded mountain-sides afford amusement to the sportsman.

The average temperatur is 9° Cels. (about 48° Fahr.), the air is mild and pure; and altogether circumstances allow of the use of the waters from the middle of May till the end of September. Visitors from England can take the route viâ either Ostend or Calais, then Cologne to Paderborn; then from Paderdorn to Pyrmont by coach in six or seven hours. In the autumn of the present year (1864) the railroad from Paderborn to Höxter will be finished; and from Höxter the distance to Pyrmont may be traversed in three hours.

CHAPTER II.

THE WATERS OF PYRMONT AND THEIR USE.

I do not know of another spot in spa-abounding Germany that has such a variety of springs for different complaints as Pyrmont, not to mention its chalybeate spring, which is undeniably one of the best in the country. Can any one name me another spot that can boast of one of the strongest chalybeate springs, a mild saline spring, a chalybeate spring impregnated with salt, and for the last two years a very strong saline spring impregnated with carbonate of iron and brom at the same time? No such other spot exists. And yet what advantages are afforded by the presence of so many different springs in one spot! Let the reader imagine, for instance, a case that is certainly not rare in life: The mother of a family, or a grown-up daughter suffers from chlororis, from the violence, irregularity or weakness of her courses, and perhaps besides, from hysterical derangement of the nerves; the husband and father suffers from stagnation of the blood in the bowels, hemorrhoids, or hypochondria; and some of the younger

members of the family suffer from scrofula. Would such a family have cause to be thankful to the doctor, if, in ignorance of the advantages offered by Pyrmont in possessing healing waters for the complaints of the various members, he were to break up the family, and send the members off to two or three different watering-places? Help could be found here for all the sufferers: the mother and grown-up daughter would drink of our strong chalybeate spring, the husband of our mild but highly efficacious saline spring, and the scrofulous children, besides drinking of this latter, would take baths in the water of the mildly or strongly impregnated saline springs. Instead of which the family physician, not aware of the state of the case, would most probably send the husband to Homburg, the mother and daughter to Schwalbach, and the children to Kreuznach.

I will mention another instance. It is well known, not only to medical men, but also to many sick females, that for the diseases of the inner organs of females — the nature of which was first made known to us by such men as Simpson, West, Scanzoni, Aran, &c., — it is often necessary in the first phase of them to drink saline, dissolving mineral waters, besides the application of saline baths, and then to drink chalybeate waters and take chalybeate baths. Would a doctor be considering the convenience and the pocket of his patients of this class if, instead of sending them at once to Pyrmont, he were to send them first perhaps to Kösen, Rothenfelde, Kissingen, and then to Pyrmont, Driburg, or Schwalbach? In Pyrmont there is a concentration on one spot of the necessary series of remedial waters requisite for his patients.

I. The Chalybeate Springs.

The Chalybeate springs, to which Pyrmont owes its ancient and well-maintained reputation, take the first rank among the mineral waters of the place. While I am engaged in penning these chapters works are being executed for newly enclosing the chalybeate springs, and it is possible that in one thing or the other changes may take place, and the following notices require material modifications. It is possible that an analysis of the water will give a result different from what has hitherto been obtained.

A. The Chalybeate Drinking Spring, and the Drinking Cure.

The temperature of the water of this spring is $12{,}5^{\circ}$ Cels., (about 54° Fahr.) the specific gravity 1,003. The spring has yielded of late years about 13 cubic metres of water in twenty-four hours. The chemical analysis made by Professor Wiggers in 1857 gave the following result:

In a pound of 7680 grains are:*

Carbonic acid	15,407	Grains
Bicarbonate of iron	0,576	„
„ „ manganese . . .	0,044	„

* Here, as elsewhere, I have not considered it necessary to give more than three places of decimals.

Bicarbonate of lime	10,477	Grains
„ „ magnesia	0,171	„
„ „ ammonia	0,003	„
Sulphate of potassa	0,233	„
„ „ magnesia	3,888	„
„ „ lime	9,054	„
Chloride of sodium	0,514	„
„ „ lithium	0,026	„
„ „ magnesium	0,696	„
Sulphate of soda	0,0005	„
Silicon	0,026	„
Aluminum	0,011	„
Organic matter	Traces	
Arsenious acid	do.	
Water	7638,866	„

The water of this spring is, like most mineral waters, mostly taken in the morning on an empty stomach, and an hour is ordered to elapse before breakfast, which may consist of coffee and a dry roll. The quantity to be taken in the morning must be determined by a doctor, and varies from three to eight six-ounce glasses, according to the case. In cases of intensive chlorosis, for instance, which require the drinking of a large quantity, or in cases in which the stomach is at the time able to take but small quantities, the patient is ordered to take a second dose after the thorough digestion of the breakfast or dinner.

The first effects of the water, which does not taste disagreeable, on account of the presence in large quantities of carbonic acid, is generally a stimulating of the appetite, part of which must, in most cases, also be

naturally ascribed to the prescribed morning walk following the drinking of the waters. Another — in many cases the primary effect on the digestive organs — is a retardation in the stool. Especially on this account, as also on account of a stimulating effect (to be mentioned presently) caused sometimes by the rich gaseous ingredients of the water — it is of great importance that we have at hand, in our saline waters, a mild solvent and aperient, a thing so necessary, and yet wanting at many chalybeate watering-places much frequented, especially by the English, as, for instance, at Schwalbach.

I spoke above of a stimulating effect produced sometimes by the use of the chalybeate waters, even on constitutions requiring the absorption of steel into the system; and I will say a few words about it. This excitement, which is evidenced by increased palpitation of the heart, flow of blood to the head, general indisposition, and sleeplessness, is partly caused by the iron, but partly also by the large quantities of carbonic acid. I will add hereupon only the following remarks, that the best measures in such cases are — a diminishing of the quantity drunk; a diminishing, by slow drinking, of the quantity of carbonic acid contained in the water, avoidance of other exciting things, such as strong coffee and wine; and the use, at the same time of the mildly aperient saline waters.

It is a fact that the use of the ferruginous water, which contains but half a grain of carbonate of iron in 7680 grains, for the space of four to six weeks, produces an effect in cases of chlorosis and poverty of blood in general, far more enduring than the larger doses of

iron obtained from the apothecary's, if not always so rapid in operation. Every doctor knows how liable those suffering from the above-mentioned malady are to a relapse, when treated in the usual manner: let them send their patients to Pyrmont, and they will obtain a satisfactory result. This is a fact evidenced by experience, but it is not so easy to explain it and define the theory. Perhaps the following is some explanation: The larger doses of chemist's preparations of steel absorbed into the system act injuriously as is well known, in a great number of cases, upon the organs of digestion, and that for a long time; whereas our chalybeate waters produce a beneficial and mostly lasting effect upon the digestion and the organs of assimilation. And I need not enlarge upon the great importance of increased absorption and a better assimilation of nutritive matter for the removal of the diseases of the blood in question. To this I may add, that most of the apothecary's preparations of steel require to be dissolved, which takes place — but certainly not without suffering many chemical changes — from the action of the gastric juice; and on this account the method mostly in use in France, viz. of giving the preparation of steel with the food, and so at a moment when gastric juice is present in the stomach, is a good one. This preparatory solution and chemical change is not necessary for our mineral waters: the dissolved iron contained therein can, as such, and unchanged, pass direct from the digestive organs into the blood. Again, the greatly diluted state of the solution facilitates the passage and absorption into the blood of the iron contained in the mineral waters; at least it appears so, when we consider the similar results observed in the

case of salts so taken. When the solution is a concentrated one, it causes a deposition of fluid in the intestinal canal, and a consequent looseness of the bowels; whereas in a diluted state it passes easily into the blood, and thence into the urine.

Those of my readers who take an interest in detailed chemical-physiological analyses of the urine, which prove that the drinking of chalybeate waters promotes a greater and more rapid consumption of matter by the body, I refer to a work of mine published in German, "Bad Pyrmont; Studien und Beobachtungen über die Wirkung seiner Brunnen und Bäder." Kiel, 1857; 93—97.

B. The Springs furnishing the Chalybeate Baths, and the Chalybeate Bath Treament.

"There are, I believe, in the whole of Germany no more powerful chalybeate baths than those of Pyrmont."
Wetzlar.

Although different springs contribute water for these baths, yet I shall confine myself to the description of the one which yields thereto by far the greater amount of water. This spring in the so-called *Brodelbrunnen*, a name given it from the fact that it is in a continually bubbling state, produced by an immense number of bubbles of carbonic acid gas.

The temperature of this spring is $12{,}5^{\circ}$ Cels. (about 54° Fahr.) and the specific gravity 1,003. The observations which have been made since the beginning of the works for the freshly walling in of the springs already

justify the assertion that the quantity of water yielded, which amounted in 1862 to 190 cubic metres in twenty-four hours, will, in consequence of these works, be much increased. The analysis made of the water in 1857 by Prof. Wiggers gave the following result:

In a pound of 7680 grains there were:

Carbonic acid	12,514	Grains
Bicarbonate of iron	0,536	,,
,, ,, manganese	0,359	,,
,, ,, lime	12,257	,,
,, ,, magnesia	1,168	,,
Sulphate of potassa	0,311	,,
,, ,, soda	2,043	,,
,, ,, magnesia	6,171	,,
,, ,, lime	7,419	,,
Chloride of sodium	1,588	,,
,, ,, lithium	0,021	,,
Silicon	0,233	,,
Aluminum	0,089	,,
Organic matter	Traces	
Arsenious acid	do.	
Water	7635,285	,,

The chalybeate baths prepared from the water of this spring, augmented by that of some others which yield less, as before mentioned, are taken at a temperature of 23—27° Réamur (83½—92½° Fahr.), generally 25° R. (88½ Fahr.); and the duration of the bath varies from a quarter to half an hour. These baths are distinquished not only by the amount of iron they contain, but also by their richness in disengaged carbonic acid gas, which, bubbling and sputtering up, gives

the bath a champagne-like appearance. The gas is so abundant and is so closely united with the water, that in spite of the continual escape of it, the water does not cease to spit and sputter at the end of a half-hour's bath; and although the bather, advised by his doctor, rubs off every five minutes or so the numberless little bubbles that settle on the skin, yet it is very soon covered again with them. And it is on and from the skin that the carbonic acid produces its powerful effect.

The nerves of the skin are excited by the carbonic acid, which causes a prickling sensation. Those parts of the skin especially which are capable of contraction — such, for instance, as the nipples of the breast — shrink and curl up; the blood-vessels of the skin become filled with blood, and stretch, and give the skin a redder hue than usual. In consequence of this prickling sensation a feeling of warmth is produced in the comparatively cool bath such as is not found in other baths of the same temperature but wanting in carbonic acid. With respect to the other various physiological changes brought about by the chalybeate baths, which I have endeavoured to follow up in all directions, where it was necessary by chemical analysis, I must again refer the reader to my oft-mentioned German work, "Bad Pyrmont," pp. 15 – 83. I will only make a few observations, easily verified by any bather. The first has reference to the remarkable diminution in the beatings of the pulse: namely, after some twenty minutes passed in the chalybeate bath, the number of pulsations diminishes by 12 to 16 in the minute. And then there arises, during a half-hour's bath, and continues per-

haps for an hour afterwards, such a striking augmentation of the urine, which is then mostly of a light water-colour and of but insignificant specific gravity, that it can scarcely pass unperceived by the patient.

As the first striking effect of the chalybeate baths shows itself in the nerves of the skin, the chemical researches on the change of the organic substances in taking chalybeate baths have not yielded me a positive result, so that the whole effect of these baths develops itself principally in the nervous system. A strong revivifying feeling is in general the immediate effect, and a lasting one the therapeutic removal of the various complaints: nervousness, migraine, hysteria, paralysis of the nerves, &c., as shall be fully explained in a future chapter. How improbable it is that when one uses the baths any other substance than water — and even this is doubted by some learned men — and gas pass into the blood, I have explained at length in my oft-mentioned German work on the springs of Pyrmont, and proved by experiments. And also therein the reader can find evidence that a direct passing of iron into the blood, in consequence of the use of chalybeate baths, is, according to the present state of science, out of the question,

I will here take the liberty of saying a few words on the preparing of the chalybeate baths. As I mentioned above, the water of the springs has a natural temperature of about 12$\frac{5}{10}$° Cels.; and in order to obtain a bathing temperature of 31° Cels. one has hitherto employed the method of boiling a portion of the water — say about one-fifth — and then mixing it in the bath with the other water. As hereby the boibed water loses

all its carbonic acid, and as the iron also, which is kept in a state of solution solely by the carbonic acid, is precipitated from this portion of the water undissolved and inefficacious, there necessarily results from this method of warming the water for the bath a loss of carbonic acid and of iron. It has been sought to prevent this by employing the so-called Schwarz's method, which consists in conducting hot vapour into the double bottom of the bath, by which means the water therein is warmed to the required temperature in a few minutes. It cannot be denied that theoretically this method is a good one, and as I have no doubt whatever that our baths would be stronger than they now are if this method were employed, I have long endeavoured to get it introduced; and *in the season of* 1864 *there be will at Pyrmont baths warmed according to the so-called Schwarz's method.* But I was of opinion that it would be better not to apply it universally at first, but rather make an essay with a certain number of baths, and that for the following reason: As I could not personally inspect the Schwalbach baths warmed in this manner, I was particular to inquire of patients who had visited Schwalbach in former years, and of whom I have every year a large number under my hands, to give me the results of their experience as to whether the Schwalbach baths or the Pyrmont baths contained the most gas. They all, without exception, declared for the Pyrmont baths; and it was particulary remarked, that although perhaps at first the Schwalbach baths warmed according to Schwarz's method gave off more noisily and in larger bubbles a greater quantity of gas, yet that the gas in the Pyrmont

baths held out much longer. It is possible that this proceeds from a difference in the nature of the two sorts of water; but it is also possible that the system of warming the water has an injurious effect upon it. In order, therefore, to prove this satisfactorily, a part of the baths in Pyrmont will next season be warmed according to the new system, the others according to the method pursued hitherto; the result will be decisive for the course to be taken in future.

In connexion with the description of, and remarks on, the chalybeate springs for drinking and bathing, I should wish to mention, though not in detail, but only *en passant*, a spring that forms a sort of connecting link between the chalybeate springs and the saline springs. I mean the "New Spring." In a pound of 7680 grains of this water there are, besides 0,457 grains of bicarbonate of iron, 8,908 grains of common salt. Although this water is admirably adapted for drinking cures, yet it is comparatively but little used because the spring is at some little distance from the general Drinking Rooms; and a mixture of water from the chalybeate and saline springs is used instead of it. I am convinced that at any other watering-place less rich in springs, the "New Spring" would play an important part.

2. The Saline Springs.

Of these there are at Pyrmont three that are used, which we shall treat separately.

A. The Saline Drinking Spring.

The water of this spring has a temperature of 10° Cels. (50° Fahr.) and a specific gravity of 1,002. The analysis made of it in 1862 by Professor Wiggers gave the following result:

A pound of 7680 grains contains:

Carbonic acid	13,927	Grains
Bicarbonate of manganese	0,159	„
„ „ lime	12,968	„
„ „ magnesia	0,191	„
Sulphate of potassa	0,013	„
„ „ soda	0,925	„
„ „ magnesia	7,446	„
„ „ lime	6,189	„
Chloride of sodium	54,201	„
„ „ lithium	0,048	„
Silicon	0,035	„
Aluminum	0,001	„
Water	7583,891	„

This spring is a good English mile from the town, and the water is brought fresh twice a day, carefully bottled, to the Drinking Rooms. Although in conse-

quence of this transport the water loses somewhat, especially of the agreeable taste it derives from the carbonic acid, yet it is a decided favourite with the public; and in the height of the season some 800 large bottles are drunk daily. Its therapeutic effects in cases of plethora, congestions, stagnation of the blood in the abdomen, diseases of the liver, scrofula, &c., shall be fully described by-and-by. I will just mention here one generally immediate and striking effect of this water upon the drinkers, viz. an improvement in the digestion. Slight stomach catarrh (even of long standing), indigestion, and dyspepsia are soon got rid of. A sense of fulness and turgescence, accompanied by want of appetite, gives place to a normal appetite. Persons of a costive habit of body are relieved by this water with more ease and comfort to themselves than by that of any other mineral waters I know of. I may add that the beneficial effects of these saline waters upon sanguineous and gouty persons — in short, in cases of too abundant and too rich nourishment, — in which the withdrawing of stuff from the body is requisite, is fully and physiologically explained by chemical analyses of urine, which I undertook in 1847, and which explanation will be found in my often-mentioned German work on the subject, pp. 100 et seq., to which I refer the reader. These analyses prove that on days on which 630 cubic centimetres of the waters of this saline spring had been drunk, 8 grains *more* of solid matter was given off with the urine than on days when none of the saline waters had been drunk, the diet being in other respects exactly the same.

B. The Old Saline Bathing Spring.

The water of this spring has a specific gravity of 1,006 and a temperature of 10° Cels. (50° Fahr.), and is composed, according to the analysis made by Professor Wiggers in 1862, of the following ingredients:

In a pound of 7680 grains there are:

Carbonic acid	9,354	Grains
Bicarbonate of manganese	0,096	,,
,, ,, lime	8,938	,,
,, ,, magnesia	0,181	,,
Sulphate of potassa	0,011	,,
,, ,, lime	20,111	,,
,, ,, magnesia	2,195	,,
Chloride of sodium	73,241	,,
,, ,, magnesium	4,514	,,
,, ,, lithium	0,005	,,
Silicon	0,041	,,
Aluminum	0,001	,,
Water	7561,305	,,

C. The New Saline Bathing Spring.

The water of this spring is drawn up from a depth of 231 metres, from a bore made a few years ago. It has a temperature of 15° Cels. (59° Fahr.), and a specific gravity of 1,028. It contains, according to the analysis made by Prof. Wiggers, the following ingredients in a pound of 7680 grains:

Carbonic acid	5,160	Grains
Bicarbonate of iron	0,462	„
„ „ manganese . . .	0,053	„
„ „ lime	12,508	„
„ „ magnesia	0,034	„
Sulphate of magnesia	0,307	„
„ „ lime	41,519	„
Chloride of sodium	245,812	„
„ „ magnesium	10,264	„
„ „ lithium	0,006	„
Silicon	0,004	„
Aluminum	0,002	„
Water	7363,819	„

This spring is a material addition to the healing treasures of Pyrmont. While up till a few years ago only the water of spring *B*, containing 70 grains of salt in 7680, and no iron or brom, was used for the saline baths, we find in the water of the new spring a considerable amount of salt (245 grains in 7680) and also as much iron as is found in waters acknowledged to be rich in iron — almost half a grain in 7680 grains. — In addition this water contains, according to Prof. Wiggers, a not inconsiderable amount of brom, although it is difficult to determine the exact quantity.

From the analysis of the water of this spring it was not difficult in theory to predict confidently its great efficacy, and in truth my observations for two years gave results far exceeding my expectations of its healing properties. We have now in Pyrmont saline baths inferior to none in Germany. Of this I shall speak more at length when treating, on future pages, of

scrofula, diseases of women, chronic cutaneous eruptions, &c.

The saline baths prepared from the waters of the springs *B* und *C* are generally taken at a temperature of 26° or 27° Cels. (79° and 81° Fahr.), and thus higher than that of the chalybeate baths before mentioned, because the carbonic acid in this latter, an element that excites the nerves of the skin and produces a peculiar and agreeable feeling of warmth, does not exist in the saline baths. And then the precautions necessary in taking chalybeate baths — viz. to make as little motion as possible, in order not to disturb too frequently the gas bubbles that settle on the skin; and to avoid sitting too deep in the water, lest one inhale the gas, which, heavier than the atmospheric air, lies on the surface of the water — are here quite unnecessary.

The Bottling and Forwarding of the Waters of Pyrmont.

Great care and many precautions are necessary in the bottling of all chalybeate waters, because there is always this danger, that the oxygen of any atmospheric air that may in some way or other get to the water, will make of the imperfect combination of the iron with the oxygen a more perfect one, and of the protoxide of iron oxide of iron, which is then no longer soluble. This danger is avoided by the great care with which the bottling of the water of the Pyrmont springs is executed. Before the mineral water is put into the bottles, these are filled with carbonic acid gas, to dis-

lodge any atmospheric air; and before the corking a stream of carbonic acid is driven into the space for the cork. In this manner the waters of Pyrmont are successfully despatched to all quarters in an excellent state. The amount bottled and sent off of late years amounted on an average to 50,000 bottles per year.

CHAPTER III.

THE IMPORTANCE OF THE THREE PRINCIPAL REMEDIES OF PYRMONT, VIZ. CARBONIC ACID, COMMON SALT, AND IRON.

Although I do not deny that *all* the ingredients shown by chemical analysis to exist in our waters may be accounted as co-operating in producing the general result, yet there is no doubt that the three mentioned in the heading of this chapter are the principal factors therein; and I consider myself justified in enlarging somewhat thereupon, and in not only considering them in their quality as ingredients in the water of a spring, but examining them at the same time from a general point of view.

A. Carbonic Acid.

The relation of this compound — known to Paracelsus and van Helmont in the 16th. and the 17th. century, but the composition of which (one part carbon and two parts oxygen) was first discovered by Lavoisier — to the

organic world as a whole, is so manysided and intimate, that it will not be uninteresting to consider this relation more nearly.

The previous existence of a vegetable world upon this earth was a necessary condition of the subsequent appearance thereon of man and other animals; and so we not only see at present that animals in general live upon plants, and that the plants again derive nourishment from that which is thrown off by the animals; but an ever-progressing natural philosophy has found means for following up this knowledge of the mutual dependence of these two kingdoms of nature. But of this I will only touch upon one point, connected with the carbonic acid now in question. About one part in 2000 composing atmospheric air is carbonic acid; and man and the other animals absorb from the air, in inhaling, oxygen, and give forth, by exhaling, carbonic acid.* The process of respiration of plants is just the very opposite: they inhale the carbonic acid given forth by the animal world, and turn it to account in forming substance and furthering their growth, and throw off oxygen — a property which, according to Priestley, appertains especially, in co-operation with the rays of the sun, to the leaves. In this manner plants and animals are of mutual importance to each other, and contribute united to maintain the original composition of the atmosphere. And as everywhere else, so also

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* Although the amount of carbonic acid in the air is comparatively so insignificant, there is yet continually suspended over the kingdom of Saxony (an area of 5,774 Eng. sq. miles) a weight of not less than 91½ millions of tons!

here do we find that the elements created by an Almighty hand are never destroyed, and that they only change their form or combination, in the different operations of nature. Just as much oxygen and just as much carbon as existed when the world was created, exist now — neither more nor less; but sometimes we find oxygen pure, sometimes forming, in combination with carbon, carbonic acid; now allying itself with one substance, now with another. At times we see carbon in its purest state as diamond, then as integral part of some organic vegetable or animal substance. The form changes, the element remains: a form can be destroyed, but not so an element; and as we know of no new creation of elements, so we cannot imagine the annihilation of those existing.

Let us now consider for a moment the combination of carbon with oxygen, *i. e.* the formation of carbonic acid, in the human body, and we shall find that this takes place in the blood circulating in the finest capillary vessels. There the oxygen of the air inhaled meets with carbon (and also with hydrogen), and the result of this meeting is a sort of combustion, which not only produces the carbonic acid given out by exhalation, but also *animal heat*, so important for animal organism.

The reader must not under-estimate the amount, in weight, of the oxygen inhaled. An adult absorbs daily in breathing about two pounds, or between 700 and 800 pounds in the course of the year. If now a person weighs at the end of a year about the same as at the beginning, this is because the inhaled oxygen does not take up a permanent place in his body, but contributes to form combinations, in which it leaves the body again;

and among these combinations the substance at present under consideration, carbonic acid, takes a prominent place.

Turning now from the contemplation of the part played by carbonic acid in the organic world, we find also a rich field for consideration in its action in the inorganic world. I will, however, in proceeding thereto, confine myself to that which now most nearly concerns us, and treat of carbonic acid as present in the mineral waters and in the *Dunsthöhle*, or Vapour Cavern of Pyrmont.

In all spring water we find a larger or smaller quantity of free carbonic acid; and this gives it its peculiar and refreshing taste. It is also carbonic acid that keeps salt of lime in solution in water, and therefore gives spring water another quality that distinguishes it from river water, viz. its hardness. If such water stands long exposed to the air, especially in a high temperature, as in a room, &c., the carbonic acid separates from the water. It is seen in pearly drops on the sides of the glass; and on bottles long in use, and not properly cleaned, one can see on the inner side a white deposit, which is nothing other than the salt of lime, which, on the escape of the carbonic acid, could no longer remain in solution. These salts are also seen on vessels in which water is often boiled, and the deposit is then denominated furs: the heat drives off the carbonic acid and the salt is precipitated. The amount of carbonic acid in all the spring water of Pyrmont is most striking: all the drinking water has in a high degree the refreshing taste consequent upon the presence in large quantity of carbonic acid: and it is possible that this quality of

the water is in some way connected with the luxurious vegetation of Pyrmont.

But carbonic acid plays a particular part in all mineral waters, including those of Pyrmont. These latter contain the following quantities of carbonic acid:

The water of the Chalybeate Drinking Spring contains in 1000 cubic inches 1062,346 c. i. free carbonic acid gas.

The water of the Bathing Spring Brodelbrunnen contains in 1000 cubic inches 862,84 c. i. free carbonic acid gas.

The water of the Saline Drinking Spring contains in 1000 cubic inches 954 c. i. free carbonic acid gas.

The water of the Old Saline Bathing Spring contains in 1000 cubic inches 640,7 c. i. free carbonic acid gas.

The water of the New Saline Bathing Spring contains in 1000 cubic inches 373 c. i. free carbonic acid gas.

Whence, now, does the carbonic acid of our mineral waters come? Although it cannot be doubted that the water of the springs has its origin in the mists, snow, and rain that descend upon the earth, and then, trickling through the loose surface and crevices of the rocks, arrives at the seat of the springs; yet the question as to where it meets with and absorbs the carbonic acid it contains, is not so easily answered. The origin of the carbonic acid found in small quantities in the common drinking water certainly differs from that found in our and other mineral waters. It is tolerably certain that the presence of but a small quantity of carbonic acid found in sweet-water springs is owing to the process of decomposition of vegetable and animal bodies in the

upper strata of the earth. But in the depths whence the mineral springs come there are no substances undergoing a process of decomposition; and, besides, even the existence of such decaying substances would never explain the origin of such quantities of carbonic acid. No doubt the seat of formation is situated at a great depth below the surface of the earth; and partly by volcanic action, partly by violent changes in the earth's surface (such as formed the so-called "Valley of elevation" [Hoffmann] at Pyrmont), communication was established between these depths and the surface of the earth; by which the carbonic acid could find its way upward. There (in the depths), however, it is decidedly formed, or rather liberated, from the layers of carbonate of lime there existing — a separation produced partly by the intense heat at such great depths below the surface of the earth, partly by the action of muriatic acid, sulphuric acid, and particulary perhaps of silicic acid.

We have thus explained the origin and formation of the water and the carbonic acid of our springs; but our waters are not merely carbonic acid waters — they are principally chalybeate waters. In them exists a certain combination of iron with oxygen (protoxyd of iron), combined with carbonic acid (bicarbonate of iron); and this important ingredient — of which by-and-by — the water principally owes to the carbonic acid it contains. Only such water as is rich in this substance can, in its course beneath the surface of the earth, over felspar containing protoxyd of iron, dissolve and absorb certain quantities of this latter.

The reader may form some idea of the quantities of

carbonic acid given off into the air by the different mineral springs, when he reads the following remarks: According to a calculation made by Dr. Graefe some time ago, 18,000 cubic feet of carbonic acid were given off by the Pyrmont springs in twenty-four hours. Bischoff found that a spring near Burgbrohle gave off from 4237 to 5650 cubic feet (538 to 717lbs.) of carbonic acid in twenty-four hours; and I found by a notice of the newly-bored springs of Nauheim, that they yield 15,000 cubic feet of gas per minute; and from another that these springs yield 500 tons of carbonic acid per annum.

The origin we have ascribed to the carbonic acid of our mineral waters is the same for the gas of the Vapour Cavern at Pyrmont, which we now proceed to describe.

Vapour Cavern.

This cavern forms a characteristic pendent to the celebrated *Grotto del Cane*, on the Lake of Agnano, near Naples. Our cavern lies higher than any of the mineral springs, and was discovered by workmen engaged in quarrying sandstone: it was lined with masonry in 1720, and renovated in 1737 by the physician of that time, a certain Seip. What takes place here is simply that carbonic acid gas streams out of the earth without being accompanied by water; but as this occurs at different times, and as the quantity of gas also varies, and, on account of its specific gravity it does not immediately diffuse itself through the surrounding air, it is more dangerous to enter the cavern at one time than at

another. With a high atmospheric pressure, and after heavy showers of rain, less gas is evolved than with a low atmospheric pressure and continuous dry weather. This cavern has been frequently resorted to by those seeking to make away with themselves; and dead birds and insects are often found in it.

The Grotto del Cane and the Pyrmont Vapour Cavern are not, however, by any means, the only spots where streams of free carbonic acid are found issuing from the surface of the earth: there are a great many already known. There is, for instance, on the Rhine a tradition that says, that no bird can fly across the Laacher Lake without being suffocated; and this is founded on the fact, that at some yards from this lake there is a hole emitting carbonic acid gas.

It is explained above that it is the carbonic acid — the consideration of which I shall now bring to a conclusion — that renders the mineral waters, in the drinking cure, more agreeable for the tongue and better for the stomach; and that for the chalybeathe baths it is the carbonic acid which is the principal ingredient, and renders them, by means of its stimulating effect upon the nerves of the skin, a so important healing agent for complaints of the nervous system.

B. Salt.

How wide-spread, in antiquity, was an acquaintance with salt, and how generally known its uses and properties were, may be concluded, for instance, from what Homer, in his Odyssey causes to be said to Ulysses,

viz. that he should travel so far till he found people who had no knowledge of the sea, and who ate no salt with their food. Scarcely did the great poet imagine what deep truth lay in his words as he united in one sentence a non-acquaintance with the sea and an ignorance of salt and its properties. I mean that the great mass of salt comes from the sea — the eldest child of creation, as Byron says. I do not say *all* salt, but only the principal part; for although I know very well that analysis (Struve) has proved the presence of small quantities of common salt in volcanic formations (which have nothing to do with the sediments of the sea) — in granite, basalt, porphyry, &c., yet there is no doubt that the principal dépôts of salt exist in the sedimentary rocks, and have therefore been deposited there by the sea at some time or other. And although we may not be able to indicate at what period this took place, yet there can be no doubt as to the fact itself, that these layers of salt were first masses of sea-water from which the common salt, together with the other salts that form the strata of rock-salt, were precipitated. If this is rendered probable by the fact that these are the *same salts* which, here as there, still occur in company with common salt, and that in exactly the same proportions, the matter is reduced almost to a certainty by witnesses which took part in the deposition from the sea, and whose bodies are still found now and then in in layers of rock-salt. Of the various organic remains found at times, although not often, in rock-salt, I will here mention only the different sorts of shells found by Philipp in the celebrated salt mines of Wieliczka, in Galicia.

As the use of salt is for the human body a necessity (which we shall explain by-and-by), so the mind of man occupies itself more or less, according to circumstances, with the procuring of it. The inhabitants of the different climates and zones have turned to the best account, in this matter, the temperature which has fallen to their lot. In the south the great heat of the sun is used to draw off the watery parts of large quantites of sea-water let into shallow basins, called salt-gardens, and the salt remains behind, although in a very impure state. In northern climates the frost is made to do duty in the obtaining of salt; namely, it was observed that when sea-water froze il separated into sweet-water ice and a strong under layer of salt, from which latter the salt is easily obtained.

The salt of layers of rock-salt which have been either discovered by chance or by scientific boring, is obtained either by mining, or by letting down through the bore fresh water to the layer of salt, allowing it to become saturated with salt, and then pumping it up again with its load of salt in solution. The salt water obtained by this latter method is then conducted into the salt works and the water driven off by evaporation. Such salt works exist also at Pyrmont. By the discovery of the immense layers of salt at Northwich, in Cheshire, England has become a land rich in salt, although before it was comparatively poor in this necessary article.

In letting down fresh water through the bore to the layer of salt man has but imitated what Nature had done in many places, in the salt springs, of which there are a large number in Germany.

The amount of salt contained in the water of such

springs differs considerably, and I will only mention here that of our springs.

In a pound of 7680 grains there are:

In the Saline Drinking Spring 54,201 Grains of common salt.

In the Old Bathing Spring 73,241 Grains of common salt.

In the Newly-bored Bathing Spring 245,812 Grains of common salt.

If we now proceed to inquire why a wise Providence has made salt so accessible the human organism; we find, firstly, as a fact expressive of its necessity, the actual result of chemical analysis, that salt is to be found in all parts of the human body. Not only this, but that salt is found therein in certain permanent proportions like other important constituent parts of the body. So, for instance, the proportion of common salt in the human blood is, to the quantity of the other soluble mineral salts, as three to one — a proportion which suffers but little change, even when some sudden great augmentation of the salt introduced into the stomach takes place. Greater changes, however, result, in cases of certain complaints; so that, for instance, the amount contained in the blood becomes diminished, as in inflammations, the cholera, diabetes, and chlorosis; in scurvy the proportion increases.

M. Barbier, a Frenchman, estimates the quantity of salt absorbed by an adult in twenty-four hours, at from half an ounce to an ounce. A man of sixty years of age would thus have consumed a total quantity of about 1000lbs. of salt in his life. Such quantities have certainly their important parts to play in the economy

of the human body; but physiology has not as yet succeeded in discovering what all these parts are, although some of them are known to us.

An important service is rendered to the stomach by the taking of salt with the food, viz. the digestion is thereby facilitated, partly by the liquefying action of the salt itself on certain ingredients of the food taken, and partly by its promoting the secretion of the gastric juice requisite for the digestion, by its mildly stimulating action on the mucous membrane. On that account the whole process of digestion is thrown out of order and the health of the body in general materially disturbed, when no salt is taken with the food; as, for instance, the great traveller Mungo Park tells us, from his own experience, when, in his travels in Central Africa, he was for a time without any salt at all. It is therefore easy to imagine that in the case of certain complaints affecting the organs of digestions, the taking of common salt, and particulary the use of saline mineral waters must prove beneficial. How wisely is it ordered by Nature that our taste should require the addition to our food of salt, and that this desire should increase in intensity in illnesses in which a greater consumption of salt is necessary. For instance, what a desire for salt herrings, &c., is exhibited by persons suffering from indisposition, &c., caused by intemperance.

From the organs of digestion the salt goes unchanged into the blood, where it has other duties to perform, which we can partly recognise. We have reason to suppose that it serves here partly for the maintenance in a fluid state of the albumen and fibrin, partly to the conservation of the form of the blood corpuscles; and

from the blood it is conducted to the different organs, where it appears to take part in the formation of the cells.

But not only as such — viz. remaining chemically unchanged — does salt accomplish the ends of its presence in the organism of man; but, consisting of chlore and soda, it is of material importance that it separates itself into its ingredients, and furnishes the bile with soda, one of its necessary component parts, thus proving of great service to the digestion.

If, now, the great importance of salt for the nourishing processes of the body — digestion, mixing of the blood, formation of cells — is beyond doubt, we shall understand, by intimation at least, of what service it is in a complaint in which the whole nourishing process is so peculiarly modified — I mean scrofula, of which by-and-by.

C. Iron.

The importance of iron in large quantities for the whole civilized world is of so ancient a date, and increases so daily, and is so generally acknowledged, that it would be useless trouble to enter into any lengthened explanation of its uses from this point of view. The ploughshare with which we prepare the ground for the seed, the scythe with which we mow the corn, and the knife which serves to cut the bread, are of iron. The grates and stoves that serve to warm us, the pipes for the gas that gives us light, are of iron: iron houses are constructed in pieces and packed up and sent off to distant quarters of the world; with iron are fought

bloody battles: our pens are of iron, and iron also is an ingredient in the ink we write with; and on iron rails we rush in one day through whole countries. An idea may be formed of the amount of iron employed from the fact, that in a single valley of South Wales, a desert fifty years since, there existed five years ago twenty-one iron forges, which produced every week 1,050 tons of iron from the ore found there.*

But instead of considering here what iron in large quantities effects, it is my intention to treat, in the following pages, *small* — yea, the *smallest* — quantities of this metal, which produce nevertheless, in organic life and in mineral waters, *great* results.

The blood of man not only contains at all times iron, but its proportion is always the same as long as the body is in a state of health. The quantity of iron in the human blood amounts to from three to four grains per pound. According to this 2000 grains of blood do not contain one grain of iron, and yet this small quantity of iron seems to be of great importance for the normal life of man. We know that iron does not exist dissolved in the blood, but that it forms a material component part of those microscopic corpuscles of blood, existing in millions in the blood, and giving it its red colour. Although in millions, as I have just said, their number is yet a definite one, for it has been discovered

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* England, which stands first on the list of iron-producing countries, produced in 1842 from its 350 smelting forges 1,100,000 tons of iron; France, 15 years ago, 300,000 tons; Sweden 100,000 tons; the amount produced in the large iron mines of the Ural Mountains is calculated at 150,000 tons; the production of Germany, exclusive of Austria, was 125,000 tons.

of late that on counting these corpuscles in small and carefully-weighed quantities of blood, the differences in their number, in the case of diseases of the blood may be noted. And just in proportion to the number of these corpuscles existing in the blood, is the amount of iron contained therein; so that we must suppose that each microscopic corpuscle, not more the 300dth. part of a line in diameter, has received from the small common stock of iron its certain allotted portion. Reckoning the amount of iron contained in a pound of blood at $3^1/_2$ grains, and the amount of blood in an adult at twenty pounds, that would give seventy-five grains of iron as contained in the blood of an adult.

The iron in the blood is not something acquired once and for ever, but as the blood as a whole represents the cashier's department of the human organism, with a great amount of business in regulating the receipts and expenses, so there are at all times escapes of iron from the blood, continually replaced by fresh supplies. These escapes of iron occur partly because the matter thrown off from the body by the proper organs always contains a certain amount of iron; and partly because the blood has to keep a number of parts of organs and substances of the body properly supplied with their normal quantity of iron: among these I mention only the muscles. It is natural that at certain times, when the body is engaged in the process of development, the amount of iron given off by the blood cannot be covered by the regular incomings. It is therefore easy to be explained why chlorosis — of which hereafter — which mainly originates in a deficiency of iron in the blood, occurs mostly in the years of bodily

development, in which the whole body, and especially certain parts of it, experiences quite sudden changes; and the more sudden these changes, the greater the danger of the appearance of chlorosis.

In a normal course of life Nature has taken the most effectual measures for covering the losses in iron constantly experienced by the blood, most of the substances proper for food containing certain quantities of iron. Milk and meat, for instances, contain about $^1/_4$ grain of iron in a pound: the potatoe contains but little, and we therefore find that most of those who live principally on potatoes have pale faces and flaccid muscles.

We have thus to do with but very small quantities when we treat of the part played by iron in the human organism: and yet it is said that the quantity of iron contained in the body of a healthy adult is sufficient to furnish materiel for an iron portrait of him. The wife of the late professor of chemistry Orfila, of Paris, wore as ornament, set in gold, a granule of iron that had been obtained from blood drawn from her husband, during an attack of cholera.

The reader will now not wonder that only comparatively small quantities of iron are contained in mineral waters.

The principal spring of Pyrmont, the drinking spring, which is distinguished among all chalybeate springs, and is called by Marcard the "King of chalybeate springs," contains in a pound of 7680 grains, according to the latest analysis, $0{,}576$ grains, or only a good half of a grain of iron. These are quantities, however, which appear at first sight in proper proportion to the

amount we have given above as contained in the blood. The proportion appears much more harmonious than that existing between the quantity of iron prescribed by the apothecary and the amount contained in the blood. In cases of chlorosis, for instance, it is quite common to prescribe 10 grains (often more) daily for a period of six or eight weeks. This makes a total quantity of some 500 grains. The whole of the iron in the blood amounts to 75 grains (as we showed above); and only in very rare cases does so much as the half disappear: thus at the most some 37 grains are wanting, and 500 are prescribed! The oft-repeated large doses are certainly at least useless, and small doses would do much more to advance the desired end, particulary when they are given in so soluble and for the stomach so agreeable a form as in mineral waters.

The iron in our mineral waters is not only in proper proportion to the deficiency of iron in the different complaints, but also to the quantities contained in the articles of food proper for man in a normal state, and which, as stated above, amount to about a grain per day. About six of the five to six-ounce glasses of our chalybeate waters, which may be considered an average daily quantity, give one grain of bicarbonate of iron.

Having now, in the foregoing, treated at length of the remedies offered by the springs of Pyrmont, let us examine, in the next chapter, what are the complaints to be alleviated by them and the method of their application.

CHAPTER IV.

THE COMPLAINTS CURED OR ALLEVIATED BY THE WATERS OF PYRMONT.

Were I, in my description of the efficacy of the waters of Pyrmont in cases which I myself have observed, to begin with the elements of the remedies found here (which elements have been described in the foregoing) and then to proceed to a consideration of the complaints mostly met with here, I should certainly find it difficult to avoid many repetitions, and the whole description would give one the impression of something disjointed. I have therefore thought it best, in order to give the whole description more unity and connection, to begin with the consideration of the different group of diseases that may be cured or alleviated, and the treatment of them.

Section I.

Complaints having their Origin in the Blood.

A. Chlorosis.

Chlorosis belongs to that class of diseases about which theory and empiricism harmonise. In antiquity,

which has left us such masterly descriptions of different other diseases, chlorosis seems to have been very little known; and it is not till the first half of the last century that it became better known. In the present century this complaint seems to have become (and to become) yearly of more frequent recurrence. It has been reserved for the men of our times to discover the nature and causes of this complaint, and not only to become acquainted by experience with the various symptoms of it, but also to comprehend theoretically most of them, and also to be enabled to lay down certain rules for the cure of the disease. We know that the only anatomical change invariably observed in real chlorosis, consists in the diminution in number of the red corpuscles of blood, those microscopic bodies which are present in millions in the blood and by their ferruginous colouring matter, give to the blood, which is of itself a colourless fluid, its red hue, and by introducing into the other organs of the body the oxygen of the air absorbed by inhalation, must be considered among the most important and necessary parts of the body. Seen from this point of view we can easily understand not only the paleness of all parts, but also that in the nervous system, the normal activity of which depends upon a regular and unhindered supply of oxygen, a number of such complaints are combined with chlorosis; as, a feeling of debility, neuralgia, hysteria, melancholy, &c. We completely understand, further, that the production of animal heat, which is dependent upon a process of slow combustion in the body, must become diminished, if the number of the oxygen-bearers, the blood corpuscles, is lessened, and if consequently too little

of that substance is absorbed upon which all combustion depends, viz. oxygen. Hence the chilly feeling of which all persons suffering from chlorosis complain. We have, however, given instances enough to prove that most of the different symptoms of this disease are easily comprehensible.

I should be going beyond my bounds if I were to go with the reader through all the different debatable questions that have been raised within the last ten years in connexion with the theory of the efficacy of iron in cases of chlorosis: it will suffice to call attention to the fact that the taking of ferruginous substances undoubtedly causes the absorption of certain small quantities of iron into the blood; and to point out how easily one may understand that this contributes to the removal of those complaints proceeding from a poverty in ferruginous blood corpuscles.*

I now proceed to the consideration of a point which belongs more property to the task I have undertaken, viz. the description of the way in which our remedies should be applied in cases of chlorosis.

The principal thing in cases of chlorosis is the drinking of the water of the chalybeate spring, and, should the illness be intensive, in not too small quantity; six to eight of the common glasses, which contain about six ounces apiece, cannot be considered too much for a day, provided the state of the stomach allow of it. I here call attention to a great and widely-spread

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* I refer any who may take interest in these questions to a pamphlet of mine entitled: "Die Bleichsucht und ihrer Heilung." Kiel, pub. by C. Schröder.

error, concerning the length of such a cure: it was formerly considered that a visit of four weeks to Pyrmont was quite sufficient for chlorosis, &c.; and for slight cases this may be, as a rule, a period long enough; but for severe cases of chlorosis it is not. For the same reason that a visit of four weeks to Kreuznach is not sufficient for the cure of bad cases of scrofula, is it useless to expect the cure of intensive chlorosis by a short visit to Pyrmont.

As a rule I prescribe for those suffering from chlorosis chalybeate baths as well as the drinking of the waters of the chalybeate drinking spring, because experience shows that a cure is more easily effected thereby. We have shown on a former page that theoretically, according to the results of the latest scientific experimental investigations, no iron can by the bathing process, pass direct into the blood; and, in accordance therewith, I must say that I have never witnessed the cure of chlorosis by mere bathing in chalybeate waters. But as I mentioned above the powerful influence of chalybeate baths, in consequence of its richness in carbonic acid gas, on the nerves of the skin, and through them on the whole nervous system, so have I also, in speaking of chlorosis, explained the different nervous symptoms in this complaint. And I opine that they who connect these two in their minds will easily comprehend that the chalybeate baths prove to a certain extent co-operative in the cure of chlorosis.

In answer now to the question as to the cases of chlorosis for which the waters of Pyrmont are to be recommended, I should simply say, for *chlorosis in all its forms and phases.* As, however, many slight and simple

cases can be cured at home by proper doses of ferruginous medicines from the apothecary's, the question should be rather, under what circumstances it would be the duty of the family doctor to advise his patients to have recourse to a much dearer method of cure, and one bringing in its train many inconveniences, too — the use on the spot of the waters of Pyrmont. In answer hereto I can truthfully give the following suggestions:

In the first place it is a fact proved by experience, that the result obtained by the inward and outward application of our waters is more radical and lasting than the employment of ferruginous preparations from the apothecary's. Therefore it is evident that the use of the Pyrmont bathing and drinking springs is to be preferred to the use of other ferruginous medicaments in those so oft-recurring cases of reiteratedly recidivous chlorosis. Patients therefore subject to recidivous chlorosis should be sent to Pyrmont. There are also many suffering from this complaint whose stomach will not bear the different ferruginous medicaments from the chemist's, which cause in some an oppression of the stomach and stomach-ache, in others vomiting; while in others again the smallest doses of such preparations, even in the mildest forms, occasion loss of appetite, a furred tongue, irregularity of the stool, and so forth. All these cases are in my opinion such as it would be best to subject to a course of water drinking and bathing at Pyrmont; for the waters of the spring agree easily with most stomachs, and, combined with the action of the baths, bring healing to many cases in which the medicaments of the apothecary were practically of no avail.

Finally, there are cases by no means rare in which

the apothecary's preparations effect a certain improvement, but are totally unable to bring about a perfect cure. Such patients should be also sent to Pyrmont, and their hopes and expectations would certainly be fulfilled.

B. Cases of Poverty of the Blood in consequence of some other illness, cases of secondary poorness of the blood.

We denominate chlorosis, treated of in the foregoing section, a primary, independent case of poverty of blood, because the change in the blood in it is the only provable invariable anatomic change in the body that takes place; we say *primary* in contradistinction to other very similar complaints, of which it can, however, be proved that the change in the blood depends upon other material changes in the body. We call such complaints cases of *secondary* poorness of the blood. We will just consider, in a few words, in what way they are connected with the waters of Pyrmont.

a) There is a class of complaints frequently met with, and which I must here first mention, which arise from a poverty of blood developed during the period of recovery from some serious illness. Who has not observed cases in which persons who have been laid low by typhus, dysentery, cholera, inflammation of the lungs, or other such acute disease, but who have completely lost all signs of the feverish workings, have dragged themselves along for weeks and months, without being able to call back their once blooming complexion? The

cause of this is in many cases the defective composition of the blood introduced into the body by the said diseases; and with respect hereto three points are to be particularly considered. The one is, namely, that every fever consumes in a high degree the material of the blood and of the different parts of the body. This rapid consumption, which is often visible in a very short time in the cases of persons with a fever, and is explained by the increased combustion (oxydation) going on in the body caused by a higher temperature, is also seconded by the defective supply of new material; for in all cases of fever the appetite is gone, and principally the desire for rich and nourishing substances. It is very clear that the deterioration of the blood and of the whole substance of the body must hereby make great strides. And then, fever patients are obliged to keep not only their bed, but also often long afterward their room: they enjoy no fresh air, and thus absorb for a considerable time much less of that important exciter of appetite, the oxygen of the atmospheric air. For this reason not only those suffering from fever, but all who are confined to their beds or rooms by sickness fall into a similar state of defective nourishment to that which I here mean.

A point worthy of particular mention is the following: In cases like those mentioned it generally happens that when the acute diseases are past, the appetite returns with renewed vigour, and by its increased activity augments the absorption of nutriment, and as a rule soon effaces all traces of thinness, &c.; there remains, however, a certain paleness, the former strength does not at once return, and there are many abnorm-

ities in the action of the nerves which maintain themselves for a greater or less period. All this in arises, in my opinion, from the fact that the common nutriments, such as albumen, amylum, and fatty matters, can be easily introduced into the body in quantity sufficient to compensate for the losses: but the same cannot be said of the ferruginous blood corpuscles, the diminution of which may be observed in almost all cases of poverty of blood. In the general course of things, if no disturbance in the economy of the human organism takes place, the blood acquires — as before stated — in the daily nourishment absorbed a sufficient amount of iron to cover the continual normal losses thereof occasioned by the never-ceasing dissolution of blood corpuscles. Should, however, in consequence of the disturbances described, caused by the above-mentioned and similar diseases, an extraordinary deficiency in blood corpuscles manifest itself, it becomes a more difficult task, and one demanding time for its accomplishment, to cover this deficiency by the usual supplies of iron taken with the food. This then is the moment for therapeutics to step in — a moment in which the doctor, by administering iron in some combination or other, can materially assist Nature. And I could certainly wish that many of my profession could witness how rapidly those reconvalescent invalids lose their paleness, are relieved from the different disturbances in the nervous system remaining from the illness just got over, and regain the full measure of their former strength, after enjoying for the space of a few weeks the invigorating air of Pyrmont, and employing its waters both

I desire to add to this consideration the mention of another complaint, in which the blood undergoes many losses — I mean chronic nephritis, in which one of the most important constituent parts of the blood, the albumen, goes off, in quite an abnormal manner, with the urine. The inevitable poverty of the blood occasioned hereby can be effectually dealt with by the Pyrmont waters, when the cases are rightly judged and selected. But the first condition is that the fever phase, that of the violent inflammation, be over. And the second point on which, after much experience I must insist, is, that as soon as anasarca, so generally present with this complaint, becomes at all strongly developed, the patient confine himself to the drinking of the chalybeate waters, and abstain from the chalybeate baths, which would only increase anasarca.

b) A second class of complaints of secondary poverty of blood is formed of those caused by diseases of the digestion. After what I have just mentioned about the consequences of a deficient supply of nourishment for the blood, it will scarcely require a further explanation of the fact, that in diseases of the digestive organs the blood soon displays a badness and deficiency in its composition.

The diseases of organs of the abdomen, which belong to this category, are manifold: I will take the liberty of mentioning the principal ones, of which the first in order are those conditions of the body caused by stomach catarrh, viz. what is generally called weakness of the stomach, dyspepsia, &c. For the treatment of these complaints we can boast of a double advantage here at Pyrmont. Not only can we operate effectually, after

the removal of the catarrh, towards the enrichment of the blood; we can also cure in the simplest manner, by the waters of the place, the catarrh itself. With respect to the method of application the following is recommended: the patient first drinks for some time of the waters of the saline spring, and as the signs of irritation diminish (and in cases where from the beginning they have ceased to appear), he can proceed, according to the individuality, to drink either a mixture of the waters of the saline and chalybeate springs, or solely of this latter.

Such cases more particulary require the use of the saline waters, at least in the first stage, where the biliary ducts and the liver take part in the catarrh and the over-fullness of blood. In such cases the symptoms of a diseased liver must be totally removed by the use of the saline waters before the patient proceeds to take the chalybeate waters for the enriching of the blood. To this category belong also the combined complaints of the liver and blood so often observed in persons whose health has been undermined by a long residence in tropical climates, and who bear in their sallow and yellowish complexion the outward signs of their malady.

In other cases, also belonging to this category, the chronic-catarrhal malady does not exist in the mucus membrane of the stomach, but in the bowels, and causes here chronic diarrhœa, so often met with, and often an unwelcome guest for years. This malady is a proper subject for the Pyrmont waters, often requiring, however, visits repeated for some seasons. There are cases in which one or more fluid stools take place with great noise, as a rule early in the morning; and the whole

nourishing process of the body, together with the tone of the mind, suffer therefrom gradually more and more. According to my experience the use of the carbonic acid chalybeate baths, which act so stimulatingly upon the skin and which leads off to it, is of the greatest importance for the treatment of this malady. The inward application of the chalybeate springs has proved of service in many of these cases, but an exact individualization of the cases is requisite. In several cases a preparatory use of the Ems waters or Karlsbad Castle waters has rendered good service; and often the patient is ordered to drink the chalybeate waters warmed.

I have further to mention, with regard to the class of complaints under consideration, some disorders of the milt, an organ concerning the physiological functions of which we are still in great ignorance. It is principally the swelling of it which is treated with great success at Pyrmont. Although, as I have just said, we are still very much in the dark with respect to the action of this organ, yet this may be considered as certain, that the milt has a great deal to do with the formation of blood corpuscles. And as we may at once conclude that any disease of this organ is followed by a corresponding deficient formation of these important corpuscles; so experience teaches us that when the milt is swollen, not only the digestion is impaired and the general nourishing processes disturbed, but more particulary a pale, ashy colour is visible in the skin. Of this peculiar ashy hue is the paleness caused by poorness of the blood in red blood corpuscles; on the other hand, the grey element depends in individual cases upon the formation of a peculiar black colouring matter, which,

especially in cases of protracted suffering from intermitting fever, shows itself in the milt and blood, and passes from the latter into different organs, and deposits itself in layers in the skin. It is a fact long known that disorders of the milt, combined with disturbances in the general nourishing processes, are consequences of protracted ague, or often arise simply from a stay of some length in marshy, fever-breeding localities. Now Pyrmont is the place of all others, where, by its chalybeate springs, this fever or marsh cachexy may be most effectually combated. Cases in which Peruvian bark alone fails to prevent the recurrence of the fits, are here cured by the absorption of iron into the body, sometimes with the taking at the same time of Peruvian bark, sometimes without it. The swelling of the milt decreases, the skin and lips resume their normal colour, the appetite, digestion and the general nutrition return by means of the use of the chalybeate springs; whereby we will not forget the important circumstance, that the patients arriving in many cases from a marshy country with noxious vapours floating in the atmosphere, find here a fresh and healthy mountain air, and a population among which a fever is a thing of the very rarest occurrence. Every year numbers of persons suffering from the consequences of protracted fever are sent here, of which many from Holland.

I will now say a few works about a disorder of the milt denominated "Leucaemia." The principal features in this malady are a diminution of the number of red blood corpuscles, so often mentioned, and the appearance in the blood of a larger number of white corpuscles than usual. As in most cases this disorder of the

blood appears in conjunction with the swelling of the milt, I have considered myself justified in speaking of it here. Although as yet there have been no cases of radical cure of this interesting and puzzling malady, yet the use of ferruginous medicines is certainly the most rational, and it is the more to be recommended, more than has hitherto been the case, to make a trial, in such desperate cases, of the strongest iron remedy of the Pyrmont waters, as I observed, a few years ago, remarkably good effects consequent upon the use of our waters.

I should wish first just to mention here hemorrhoids, a disorder of the abdomen which is closely connected with changes in the blood, and not seldom occasions poverty of the blood. This complaint has so many diffferent phases, and manifests itself in so many various forms, that it requires different modes of treatment; and just in this point Pyrmont possesses, by the variety of its healing waters, peculiar advantages. Although I must refrain from giving here a detailed explanation of the nature of hemorrhoids, yet I feel myself compelled to declare, that, in my opinion, those of the profession are in error, who, in their endeavours to explain and give a true value to the physical-chemical relations existing in the disorders of the organism — endeavours in themselves laudable — declare that also hemorrhoids proceed from the following cause, viz. that in consequenze of *mechanical* hindrances in the chest or abdomen, the circulation of the blood in the veins of the abdomen, and especially of the rectum, is hindered, or rendered slower. It would be very difficult, were this the case, to understand how it comes that this complaint is so often an hered-

itary one; and then, again, this hindering can be proved in but comparatively few cases; and one should never go in theory farther than facts justify one in doing. Contrary to the supposition of a complaint proceeding only from mechanical causes, I am of opinion, after what I have seen, that the matter is as follows. Many men have swelling of the hemorrhoidal veins and loss of blood from them, without these being preceded by any other indisposition: this is comparatively seldom the case. It mostly happens that men suffer long from disorders of the abdomen: indigestion, wind, acidity, oppression of the stomach, feeling of fulness in the region of the upper-belly, diarrhœa alternating with costiveness or the latter predominating; in addition the urine often gives off the well-known red deposit of urates. After this has lasted some time, combined with hypochondriacal feelings, it ends in congestion of the rectum: the swelling veins form the well-known hemorrhoidal knots; the stool consists of little balls enveloped in slimy matter, small quantities of blood escape, and the above-mentioned series of disorders of the abdomen have disappeared. Or the complaint appears in the following modification: Men suffer long, perhaps years, from congestions to the head, combined often with general agitation, which only lastingly cease when the congestion flies to the rectum. But not always does the matter go off so favourably: one often meets in individuals of families notoriously subject to hemorrhoids the disorders of the abdomen mentioned above, or congestions to the head or chest; one sees the agitation, one observes the hypochondriacal condition; but in vain one waits for the desired swelling of the rectum. Shall

we then consider these symptoms, — of which we know and have seen that they often come to a desired end in hemorrhoidal swellings and bleedings, — as long as this end does not make its appearance, as isolated complaints, and treat them as such? I consider this very wrong and of scant benefit to the patient: according to my opinion, on the contrary, they should be treated as being connected with the disorder whence they arise, and with regard to the end to be obtained.

In what way are the Waters of Pyrmont to be applied in cases of hemorrhoids? In the first phase of the complaint, when the above-mentioned disorders of the abdomen are present, when congestion, determination of blood to the head, and orgasm show themselves — the drinking of the waters of the saline spring for some weeks has a most favourable effect; and this will become the more manifest if we reflect that by the use of the saline waters the constant change of the substance of the body is rendered more rapid; *i. e.* in a given time more substance is thrown off than is assimilated; as also that the persons suffering from the complaints in question are mostly good livers, who indulge in a too copious and fattening diet. The less head and chest suffer from congestions, the less the symptoms of full-bloodedness become prominent, and the more hypochondriacal-nervous symptoms show themselves — so much the more beneficially does a mixture of the waters of the chalybeate spring with that of the saline spring act thereon. One attains thereby more easily the desired end, the congestion to the rectum, particulary when one takes the chalybeate baths and before leaving orders a quantity of the cold spring water to

be poured over the back in the neighbourhood of the loins. One should carefully avoid in such cases such a use of the saline waters as would act in a violently aperient manner upon the bowels, for this would only render such hypochondriacal persons suffering from hemorrhoids still more irritable and nervous. By the inward application of the chalybeate waters, and a simultaneous use of the chalybeate baths generally those persons are much alleviated who are advanced in life, and to whom the bleedings occur often and not seldom with great violence, accompanied by visible or invisible large hemorrhoidal knots mostly flaccid; and further, those lank men with flaccid epigastrion and marked poverty of blood, sleeplessness, with care-worn countenance and melancholy look, who talk of their blooming health and luxuriant *embonpoint* in days gone by. The bleedings are restrained, the strength returns, the sleep becomes less agitated, after a few week's residence at Pyrmont and the inward and outward application of the chalybeate waters.

C. The so-called "Goggle-eye" Cachexy.

This cachexy, which is often named the Basedow complaint, after Basedow, who first described it, but should more properly be named the Graves complaint, is in so far an acquisition made within the last ten years, as it either did not exist before, or, what is more likely, was not recognised as such. At present, when the connexion of the various links of it has been discovered, almost anybody, without being a physician,

is able to mark the symptoms of this complaint. The principal of these is an animal-like prominence of the eye-balls, of such intensiveness as must strike every one: the second important symptom is a wen-like swelling on the neck, sometimes on one side, sometimes on both sides equally: the third is an agitation of the heart, mostly very intense, a nervous throbbing of the heart without at the same time any organic disease of the heart, except a certain enlargement of this organ, which is now and then observed in such cases, and must be considered as a consequence of the agitation. The beating of the heart is generally very rapid, and I have observed in patients newly arrived here 110—130 beatings per minute. This intense excitement of the nerves of the heart is generally accompanied by a great irritation in the whole nervous system. In the majority of cases, as regards females, there is also a slight irregularity of the periods. The saddest of the consequences of this prominence of the eyes seldom occurs, happily: but there are cases in which this prominence attains such a degree that the eyelids are not able to cover the cornea: the eyes become red and inflamed, the transparent cornea at first becomes dim, then breaks through, and the destruction of the eyes is the consequence; nor can anything remove the blindness which ensues. Although I have under my care on an average per year some five or six sufferers from this complaint, still I have as yet had but one case in which the affection of an eye had the above-described sad consequences: and, as far as I know, the case mentioned in the works treating on the subject do not amount in all to more than twelve.

Theories the most varied have been put forward in explanation of this complaint, but as yet not one has succeeded in establishing itself. All we know of this complaint is that the taking of ferruginous medicines has proved more efficacious than any other method of treatment, and in no other form or combination does the iron act anything like so efficaciously as in our chalybeate waters, with simultaneous employment of the chalybeate baths, which act so evidently beneficial on the whole nervous system. I have at my disposal a number of cases, dating from different seasons, which have turned out favourably, and I will not omit to mention, firstly, that in certain cases one must be very careful at first in taking the rich gaseous chalybeate baths, often bathing only every other day, and often shortening the duration of the bath. Further, with respect to the drinking of the chalybeate waters, one should not so much think of increasing the quantity taken per day, as of lengthening if possible, the time of cure; and, finally, the removal of all the symptoms is not to be expected in *one* year's visit, but requires the taking of the waters several years in succession. This demand, however, meets as a rule with but little opposition on the part of those suffering from this evil, who have often tried in vain so many things, and would put up with anything in order to get rid of a complaint so deeply felt by all, and especially by the female mind.

Section II.

Affections of the Nervous System.

It is a greatly and widely-spread erroneous idea — one I myself entertained before I saw and observed on the spot how things really are — that the nervous disorders of those who have been cured by chalybeate waters in general, and by those of Pyrmont in particular, have proceeded from poverty of the blood, and that therefore the disease has been cured by the introduction of iron into the organism. However true this may be for a large proportion of nervous disorders, I distinctly deny the truth of this assertion as applied *universally*. There are a not inconsiderable number of individuals suffering from nervous disorders who certainly do not suffer from poverty of the blood, and who therefore cannot bear the inward application of the chalybeate waters, with its quantum of iron to be introduced into the blood; and yet are cured of their nervous complaints by the use of the chalybeate baths, which certainly introduce no iron into the blood. As is mentioned on a former page, it is the large amount of carbonic acid in the water of the baths which produces such a manifest effect, first on the nerves of the skin, and thence on the whole nervous system.

In the treatment of the different sorts of nervous disorders, we have to employ the means at our disposal according to the individual difference of the case. Such differences can be judged of by a professional man

only, and the use of the waters without the necessary advice from a doctor would be a foolish proceeding.

The most common case is perhaps this, that the nervous complaint is caused by poverty of the blood, and that for the healing of the fundamental evil the inward application of the chalybeate waters is the principal remedy to be employed; but that, at the same time, the nervous attacks — secondary in their nature, it is true — are directly met by the chalybeate baths. There are again independent nervous disorders, so to speak, in which the blood appears in no way to suffer; and those suffering therefrom must mostly confine themselves to the use of the chalybeate baths, whereby, however, it may again become necessary, in consequence of a too great irritation of the nerves, first to take a number of soothing saline baths. And finally there are cases in which there exists a fullbloodedness rather than poverty of blood with different nervous complaints. Such cases occur, more particularly in connexion with disorders of the abdomen, hemorrhoids, and hypochondria, in the case of men — with disorders of the inner sexual organs, in the case of females; and these require the use of the chalybeate baths in conjunction with the inward application of the saline waters.

So much on the use of the Pyrmont waters for nervous disorders in general: I shall now proceed to consider the different disorders in detail.

A. Nervousness and Hysteria.

I propose to consider in one section these two disorders, because they are closely connected and are to a certain extent only different phases and periods of development of one and the same complaint — a condition of the body so little suffering as to border on the one side on comparative health, but descending by degrees to a state, at the other extremity, of dangerous illness.

As constitutions are endlessly different, and no two characters are exactly alike, so is also the degree of sensibility of the nerves as various as possible in different individuals. There are persons who are so impervious to outward impressions, and so difficult to put out of countenance, that the approaching fire only forces them to quit their seats when the neighbouring wall becomes too hot; a timid dame, on the other hand, begins to tremble at the still distant cry of "Fire!" We see constitutions of such strength that their possessors can, after their regular daily work, pass the evenings and nights for weeks in succession in drinking and such like so-called pleasures, without feeling or appearing to feel any ill effects whatever from such a course; while there are other persons, especially among the weaker sex, who, after speaking perhaps for an hour, or being obliged to pay or receive a visit, are so knocked up that they incessantly yawn for half an hour; others are obliged to leave the ball-room because the music is too much for the nerves, or suffer all day from the effects

of a half-night's stopping-up, or of sudden news. While the sawyer sits down quietly to file the teeth of his saw, many a nervous mother is nearly frightened out of her wits when her little son, writing on his slate, holds his pencil a little too upright and produces a shrill screeching sound; and while many persons scarcely perceive the different odours they meet with in their walks, many a nervous lady cannot sleep in a room where there is a heliotrope or mignonette. While it is a pleasure to see powerful natures in an equable frame of mind in harmony with existing circumstances, we mostly find in persons of the above-described character great capriciousness, indecision, and impressibility, which in physical matters indicates the same excitability that I have striven to describe, by the examples given above, as existing in the nerves performing bodily functions.

But further examples are unnecessary to characterise more narrowly the peculiar excitability and little serviceability of the nervous system of many females, which we call nervousness and weakness of the nerves, and which renders them and those around them miserable.

The transition from this state to fully developed hysteria is a gradual one, and there are various intermediate phases It cannot of course be my intention to give in these pages a detailed description of hysteria in its various forms. Should any one desire to know my opinion on the subject more fully, I refer him to a work of mine thereon, entitled "Die Hysterie und ihre Heilung." Erlangen, 1852. Here I must confine myself to short notices, in order to describe the employment and effect of the Pyrmont waters in cases of hysteria. With respect, in the first place, to the nature of this

proteus-like complaint, I have attempted, in the above-mentioned work, to make it appear clear that defective nourishment of the nervous system is the great cause of the phenomena noticeable in hysteria — a supposition that, to my satisfaction, has been adopted by most of the more recent writers on the subject. Only by the supposition of such a fundamental cause is it explainable how, in this disorder, not only a change in the phenomena and activity of the several departments of the nervous system — of the brain with its mental activity; of the spiral marrow, and of all the perypheric parts of the nervous system — can show itself; but also how the phenomena of the diseases indicate now an increased excitement, now a less degree of excitement of the nerves. Yea, one and the same hysterical individual will display now pain, now want of feeling — now paralysis, now cramp, &c. &c.

With respect to the causes which produce hysteria, I agree that in many cases they escape us, but yet in many others it is often possible to discover them. In first rank I place the inheriting from parents; for just as a similarity in appearance, as disorders of the blood, gout for instance; disorders of the organs of respiration, such as consumption; and of the digestive organs, such as hemorrhoids — pass from father to son, there is nothing absurd in supposing that abnorm alorganisation of the nervous system — as may also arise later through abnormal nourishing processes — can become hereditary. A second cause producing hysteria is to be found in physical influences of the most different kinds, whether arising from the education, the affections of the mind, or some other cause. He who is aware that the whole

nervous system can be influenced from the central organ, the brain; and he who, further, is of opinion that this brain is the organ of the soul — will find nothing absurd in the supposition that mental influences con produce anomalies in the action of the whole nervous system. A third cause active in producing hysteria is found in local irritation. Well-known it is that an ever-gnawing pain has something consuming and wasting. Such local irritations act just in this manner when they have their seat in a sphere whence apprehension and melancholy are particularly prone to arise, and present themselves as co-operating influences. Here I refer principally, as the reader will have already perceived, to local irritation arising from some unhealthy condition of the sexual organs of females — a matter which will be separately treated of on a future page. There remains yet for consideration, however, the most important of all causes producing hysteria. It will be evident to all that those parts of the whole organism which are the most sensible in their organisation, must suffer first and most severely when the whole nourishing matter is changed; that in a word, the nerves suffer when the blood is composed deficiently. And so it is indeed. By far the greater number of the cases of hysteria arise from poverty of the blood. There is scarcely a single case of chlororis — as I have already mentioned, in treating separately of this complaint — which is not accompanied by a greater or less disturbance of the nervous system; and cases occur in which persons suffering from chlorosis are at the same time martyrs to *acute* hysteria. And the same that takes place in this primary poverty of the blood, chlorosis,

is also observed in all the above-described cases of secondary poverty of the blood, in which, namely, this is the consequence of other complaints either still present or already past and gone; so that here hysteria is the third member in the series of complaints.

It often happens that several of the above-mentioned causes and fundamental complaints co-operate in producing hysteria; for instance, this is the case with the third cause mentioned, in which namely, in addition to disordered sexual organs, poverty of the blood is developed, and co-operates in producing hysteria.

After thus explaining the causes of hysteria, I will proceed to mention in a few words some differences in the symptoms of the disease, as also in respect to the degree in which it occurs, in order to connect therewith my remarks upon the method of employment of the Pyrmont waters in order to a satisfactory result.

The slightest degree, general nervousness, which is characterised by a generally increased irritability and a weakened force of action on the part of the nerves, has been already mentioned. Somewhat further developed, hysteria shows itself when the irritability increases or changes into attacks of pain in different parts of the nervous system, among which one, well-known under the name of *migraine*, a peculiar sort of headache on one side only, plays an important part, together with which, and as more general ones, I will still mention nervous stomach-ache and face-ache. There mostly appear also in this degree, or in the lighter forms of hysteria, slight attacks of cramp, caused and put in motion generally by the increased excitability of the nerves of feeling and the senses, and of the *mental*

sphere. As the more general I mention only spasmodic yawning; those feelings of tightness and oppression and of the rising of a little ball in the throat, caused by cramp in the throat; as also that spasmodic crying and sobbing mingled at times with hysterical laughing.

The more and most highly developed forms of hysteria, finally, I should call those in which it at times rises to most violent general attacks of cramp, to the different forms of convulsions, and even to a form of epilepsy; as also those in which paralysis of different kinds — in the arm or leg, of the eyelid or the visual nerves, &c. — occurs.

It would of course lead me too far, were I here to to mention and explain singly all the different forms of hysteria; the hints given and the remarks made may suffice for our aim.

With respect now to the use of the waters of Pyrmont for this malady, a process of individualisation must take place according to the cause and particularly to the degree of the excitability in each single case. In cases of hysteria in which poverty of the blood is prominent it is evident, from the preceding, that both the inward application of the chalybeate waters, and also the taking of the chalybeate baths, which act direct upon the nerves by their richness in carbonic acid, are to be strongly recommended. And as also in hysteria of long standing proceeding from other causes, a deterioration of the blood is often observable, a careful use of the *chalybeate waters* should be essayed in most cases of hysteria in which there is no decided appearance of fullbloodedness. In the use of the very exciting chalybeate baths care must be taken that the excitability

of the nerves be not considerable: when for instance there is a great liability to convulsions, the patient must abstain altogether, at least at first, from the use of the chalybeate baths. The richness of Pyrmont in springs of various sorts is here evidently of peculiar value. When nervous patients begin with a series of weak saline baths, this is in general to blunt the excessive sensibility, and they can then bear the chalybeate baths, not always, however, for half an hour, and daily.

Those local irritations, also, mentioned above as often causing hysteria, require at times modifications of the treatment prescribed for hysteria. For instance, is the local irritation in any way accompanied by congestion, swelling, or inflammation, a treatment with the chalybeate springs alone would evidently prove too exciting. In such cases a commencement must be made with the saline spring alone; by-and-by a mixture of the water of this spring with that of the chalybeate spring can be taken; and so gradually till the patient can drink the chalybeate waters alone. In the same way with the baths: such patients first bathe in the water of the saline spring, and afterwards employ that of the chalybeate spring. It needs scarcely be mentioned, that I here confine myself to the employment of the waters of Pyrmont, and omit to treat of local bleeding and other remedies which might prove necessary.

Of the most energetic means of cure allow those cases of hysteria in which the excitability gives place to the paralytic symptoms. As in these cases electricity and other existing means of cure are elsewhere em-

ployed, so here, we make use of cold shower-baths, which, applied to the suffering parts or to the spine, act in a stimulating manner upon the whole body.

B. St. Vitus's Dance and the Waters of Pyrmont.

This complaint is so well-known that I may be excused from making a detailed description of it. I will only mention, that although in a large number of cases it is impossible for the medical man to discover the cause of it, yet in others this complaint, which, like chlorosis, so often shows itself in the period of development of females, is closely connected with poverty of the blood, a fact indicated by various symptoms, and among them the rushing noises at the heart and in the veins of the neck. In harmony herewith is the fact that of all remedies the employment of ferruginous medicines has proved the most efficacious. When it is known that most of the cases of St. Vitus's Dance disappear in a few months without powerful remedies, it will be easily understood why, generally, in recent cases, the patient is not sent to be cured at our waters. But those in which the malady lasts, off and on, for a half-year, or even for a whole year, when at last the patience of the sufferer, his relations, and the doctor is nearly brought to an end — cases in which the most powerful remedies have been applied, such, for instance as arsenic (certainly inimical to the organism in general) and nitrate of silver — such are the cases sent here because experience has proved that, when all other means had been essayed in vain, Pyrmont has rarely failed to pro-

duce the desired result. In my opinion, equal importance herein must be attributed to the final removal of obstinate poverty of the blood, which is often the fundamental evil, by the inward application of the chalybeate waters, and to the chalybeate baths, so rich in carbonic acid, which exerts an independent direct influence upon the nervous system. Mention must also be made of such cases of St. Vitus's Dance in which the complaint itself may be considered, on the whole, to have long ago disappeared, but in which, however, either a certain working of the muscles of the whole body, or an agitation and weakness in some single member, yet remains. In such cases, also, I have observed great good to arise from the employment of the waters of Pyrmont.

C. Neuralgia, Convulsions, Paralysis.

I have already spoken of neuralgia, which evidently proceeds from poverty of the blood, then of the face-ache, gastralgia, &c., to which sufferers from chlorosis are liable; and neuralgia as phase of hysteria has also been under consideration. But there are other sorts of neuralgia which are successfully removed by the use of our waters. For the so-called rheumatic neuralgia the chalybeate baths are useless, but saline baths, as is well-known, are employed with great success; and those at Pyrmont, lately so materially enriched by the discovery of the so-called New Spring, need fear no comparison with any in Germany. Further, in respect to this sort of neuralgia I will not omit to observe that in

some cases of this malady when originally caused by rheumatics, and when of long continuance, as is not seldom the case, there comes a moment when the rheumatic character is either forced into the back-ground or it disappears entirely, and when, besides, in consequence of the duration of the malady the whole organism becomes reduced, and the blood deteriorated. This can cause no wonder in a complaint which forces one sometimes to keep the bed or the room for months, or half a year or more, and tends, in consequence of the violent pain it occasions, to excite and exhaust the patient, to banish sleep, &c. In all such cases the inward and outward application of our chalybeate waters prove of great efficacy. And as this occurs with neuralgia proceeding originally from rheumatic influences, so it is with other sorts of neuralgia — the face-ache, nervous sciatica, neuralgia interiostal, &c., for the causes of which and their long duration no reason can, in many cases be given.

With respect to the effects of the Pyrmont waters on convulsions, the hysterical convulsions have been already mentioned, and I will only add, that in all cases of acute convulsions, in all such as are caused by a still existing diseased state of the central organs of the nervous system — the brain and the spinal marrow — whether it be inflammation, congestion, effusions, tumours, or such like, in these organs, as also in epileptic convulsions the use of the chalybeate waters must be wholly avoided.

There remain now but a few sorts of *local* cramp to be considered, which are sometimes curable by the waters of Pyrmont. To these belong *writing cramp*, so puzzling as to its nature and origin, and for which as

yet therapeutics has yielded no remedy, but which has been, in some cases, alleviated by the use of chalybeate waters. Another complaint of this category is the tic convulsiv, which is a cramp-like contraction of the muscles of the face. Lastly, hereto belongs also the cramp affecting the muscles of the neck dominated by the *nervous access. Willisii*, causing a one-sided jerking of the head now to the right now to the left, at other times an involuntary nodding. Although it is asserted that in general we know little or nothing of the origin of these complaints, yet I must mention here that I have discovered, in many cases, that two things seem to exercise an influence on the origin and development of these complaints. I have remarked this, namely, in a tolerably certain manner in cases of *onanism* and of excessive use of tobacco. For instance, I had under my care, two years ago, a gentleman who suffered much from this sort of cramp, and who declared that he smoked daily fifteen cigars of the strongest sort. Abstention from this and the use of the chalybeate waters soon produced an evident improvement; but I have since heard nothing of this gentleman — a case, alas! by no means rare.

As conclusion to this chapter I will say a word as to the effect on paralysis of the waters of Pyrmont. Of hysterical paralysis I have already spoken on a former page. Of the many other sorts of paralysis I will briefly mention only those which are fit subjects for the Pyrmont waters, and those for which not even a trial of them should be made. Rheumatic paralysis, as long as it retains its specific character, is a subject for Wiesbaden, Töplitz, Rehme, &c.; but there comes a moment

when this specific character disappears, and is followed by a greater independency of character. In this phase of the complaint direct stimulating remedies, like electricity, &c., should be employed; and here also our chalybeate baths, which are so stimulating through their richness in gas, do good service. The same may be said of paralysis caused by the absorption of poisonous substances; such for instance as plumbum.

If for this complaint common remedies have proved of little or no avail, and sulphur baths have been employed without removing it entirely, the rest of the paralysis is successfully treated by our chalybeate baths.

The diphtheritic paralysis so often observed in cases of epidemical gangrenous quinsy, are certainly the more subjects for the immediate employment of the waters of Pyrmont as this complaint is certainly less a consequence of any local affection than of general poverty of blood. On this matter, however, I have had no practical experience to speak from. With respect to the treatment of this sort of paralysis I place it in the same category with those which often remain after other acute diseases, as, for instance, typhus, &c., which are most successfully treated here.

It still remains for me to speak of the sorts of paralysis caused by a local diseased state of the central organs of the nervous system, the brain and spinal marrow. In general one can most distinctly assert, that as long as from the other symptoms the existence of inflammation, or only of congestion, may be supposed, *the waters of Pyrmont should by no means be taken.* We see this most plainly in cases of apoplexy of the brain. When, in that latter phase of this complaint,

when years have passed, no rush of blood to the head is felt, and everything indicates that the existing paralysis has been caused by the irreparable loss of substance formerly suffered by the brain, and the formation of scars — I say that, when in this phase, an essay with the Pyrmont waters is admissible, which also do really repair in some measure the shattered powers and partially remove local paralysis, yet in an anterior phase, when the abnormal flow of blood to the brain still exists, together with congestion, inflammation, and exsudation, the use of the waters of Pyrmont should never be even essayed. As much we can say of paralysis caused by other states of inflammation and processes of softening, as also by after-growths in the brain and spinal marrow.

These remarks apply also to that sad diseased state of the spinal marrow, the *tabes dorsalis*, which conducts its victims — who may be recognized by a peculiar uncertain gait — slowly, but almost enevitably, to a sad end. There are also symptoms of this complaint which are not rare, and among them more particularly pains and twitchings in the legs, which indicate the existence in the spinal marrow of a more or less intensive inflammatory irritation; and herewith the anatomical discoveries of late years are in perfect harmony. As long, therefore, as this is the case, the patient must avoid altogether any essay of the exciting chalybeate baths of Pyrmont. On the other hand, till we have some more efficacious remedy to offer to the unhappy sufferers from this complaint, I should recommend an essay of our chalybeate baths in all phases of the complaint in which no symptoms of inflammation are visible. One must not, however, indulge too sanguine hopes of the therapeutic

effects of these baths. All that can be attained is the arresting of the progress of the malady, and a general improvement of the bodily powers; I never yet saw any one cured by our waters.

I should like to briefly mention here one sort of paralysis peculiar to the stronger sex which is often most successfully treated at Pyrmont by the inward and outward application of the chalybeate waters. I mean that state of weakness mostly a consequence of onanism in early youth, and, as a rule, accompanied by profound hypochondria, which causes the patient to view his malady through a magnifying glass and to consider it as a case of indisputable disease of the spinal marrow

CHAPTER V.

THE HEALING POWER OF THE PYRMONT WATERS FOR SCROFULA.

As great as is mostly the harmony of views, both on the part of medical men and of non-medical men, as to whether any certain individual is scrofulous or not, just as divergent are their views when called upon to define what scrofula is — what are the certain changes in the composition and action of the organism that cause this malady. The science of the present day, which aims at *positive* knowledge, and cannot bear to fill up the gaps in it with mere opinions and fancy pictures, makes no secret of its ignorance as to the nature of scrofula, and contents itself for the present with characterising anatomically and physiologically each single symptom of this malady, waiting till facts which may result from further researches justify it in setting up views and theories. I must of course confine myself here to make the few observations that are necessary to prove the truth of my therapeutic remarks.

We know that it is characteristic of scrofula, that those suffering from it are subject to chronic inflammation, which manifests itself now in swellings, now in tumours and catarrhs; we know that the scenes of these eruptions, &c., are firstly and particularly the skin; then the mucous membrane of the organs of the senses opening out on the surface of the skin; the bones, especially at the joints; and, above all, the lymphatic glands, which manifest sympathy with neighbouring inflamed parts by swellings and tumours, but in some rare cases are the first to show irritation. This great sympathetic action of the lymphatic glands has caused some to give this complaint the name of the gland disease.

In the case of scrofula the circumstances connected with the process of nutrition are of a doubly different character, and therefore produce doubly different types under which scrofulous persons may be classed. In one class, namely, the consumption and change of matter seem to be retarded in general, the secretion of fat preponderates, so that such persons have a bloated appearance — a thick flabby upper lip, a swollen nose, a fat body, &c.; and all this gives these persons, who are at the same time pale and weak of muscle, a peculiar appearance. On account of the great want of sensitiveness on the part of the nervous system in persons of this class, this sort of scrofula has been named the *torpid scrofula.* In the other class the formation of substance, and particularly of fat, is rather defective than otherwise. This class of individuals are subject to the above-mentioned unhealthy eruptions, tumours, &c.; they are thin, pale, and the veins of the skin are seen; they are

lively and have in many respects an excited nervous system. We call this sort of scrofula *erethistic* or *florid scrofula.*

While for these two different forms many necessary conditions for a removing of the malady are the same, as, for instance, the enjoyment of pure, fresh air (for the most cases of scrofula are certainly caused by close rooms), the taking of fresh animal food in not too small quantities, frequent exercise of the muscles, &c., yet in many other respects a difference of treatment is necessary. Of these differences of treatment I will only mention one, to which by far too little regard is paid. There is reason in prescribing for a lean individual with irritating, florid scrofula a fatty diet; and, further, cod-liver oil owes its well-merited reputation as remedy for scrofula to its great efficacy in these cases. But there is no reason in prescribing for the corpulent scrofulous patient, with a proneness to the deposition of fat, still more fat in the shape of large masses of cod-liver oil. But for *all* cases of scrofula the use of the saline springs is beneficial, as is proved yearly by large numbers of such patients who flock to Pyrmont. Of primary importance in *this* course of treatment is the outward application of the saline waters — the taking of saline baths. This is principally what experience teaches us; and I will not by any means deny that our knowledge of the *way* in which the saline baths act in scrofula is very confined. While the taking of our weaker saline baths is of great efficacy for the weaker forms of scrofula, with irritable florid habit of body — which saline baths were, two years ago, our only ones, — we have now for the more intensive cases of scrofula

— for the bad complaints effecting the bones and the joints, for the often considerable swelling and stretching of the glands, for obstinate scrofulous eruptions of the skin, particularly when the persons show a torpid habit of body — in our newly-discovered strong saline spring, containing both iron and brom, and applied outwardly, as baths, a powerful remedy, which we can with confidence compare with the best remedies of the kind anywhere — with the baths of Kreuznach, for instance. With respect to the inward treatment to be employed at the same time with this bathing cure and a proper diet, I consider that for a thin scrofulous person of erethistic habit of body cod-liver oil is the best possible remedy; but in other cases in which poverty of blood is very evident, a mixture of the waters of the saline spring with those of the chalybeate spring is often of the greatest service. On the other hand, in cases of torpid scrofula, so often mentioned, I consider the use of the saline waters the best remedy, as thereby not only are the organs of digestion (which in such cases are in a state of greater or less prostration) stimulated, but at the same time the process of transmutation of matter is promoted in the manner described on a former page. For particularly obstinate cases of this malady I prescribe, besides the strong saline baths, other saline waters still more powerful in their effect, on account of the iod and brom they contain, of which the Adelheid spring, near Heilbrun in Bavaria, has as yet proved the most efficacious.

Section IV.

The Waters of Pyrmont and the Disorders affecting the Sexual Organs of Women.

It cannot of course be my intention to give here a detailed description of the above-mentioned complaints, which in the last ten years have been the objects of such great attention and interest on the part of the profession. And more particularly quite recently much new light has been shed upon the relation of these complaints to different complaints of females in general, and upon the remedies to be used for them. I shall therefore content myself with describing in short sketches the complaints of this kind for which the Pyrmont waters would prove efficacious, passing over all irrelevant matter.

The two principal relations of these local affections to other complaints that I should like now to consider in a general manner, are poverty in blood, and nervousness and hysteria. It is one of the most common experiences to find that these complaints are *consequences* of disorders in the sexual organs; and it daily comes to my notice in the season that ladies come here on account of their nervousness, which, on closer examination turns out to be a consequence, of some disorder in the abdomen. The way in which nervousness is caused by disorders of the sexual organs is not the same in all cases. A very common case is the following: poverty in blood appears as link, viz. the disorder of the sexual

organs causes poverty in blood, and this latter, again in the manner described, produces nervousness. For instance, by the loss of blood which is often connected with disorders of the sexual organs, and by too frequent and strong periods, also by excessive whites, the composition of the blood is deteriorated. In other cases, on the contrary, the continual irritation connected with the local affection appears by its action upon the nervous system, to exercise a direct pernicious influence upon it. At least the cases are not few, in which ladies suffering from hysteria show no signs of want of blood, and in which one can imagine but one reason for their nervousness and hysteria, viz. a disordered state of the sexual organs.

Very frequently, however, the causal relation is of a completely opposite nature, so much so, indeed, that an existing disorder of the blood becomes the *cause* of an unsound state of the sexual organs. We often observe this relation, for instance, in the loss of blood, and violence of the courses, which in very many cases are caused and maintained by the existing poorness of the blood. We also see, further, this relation very often in the whites, which are very commonly caused by chlorosis. It is evident enough from the consideration of this double relation, of how great importance for the treatment of the complaints in question must be our chalybeate springs. But also the saline springs are of inestimable value in certain phases and for certain degrees of the maladies mentioned, as shall be shown when I come to speak of the complaints singly. The particular complaints which we shall briefly treat of, one after the other, are: the whites (*leucorrhœa*), hemorrhage

chronic inflammation of the womb, sterility and proneness to abortion.

a. The Whites. In the treatment of this complaint there are different points to be observed. The first anatomical cause of the whites is always a catarrh of the relative mucous membrane in its upper or lower part. As, however, this catarrh, in the great majority of cases, only accompanies and attends upon other disorders of these organs, it is necessary in the first place to discover what these disorders are, because only by the removal of them is it possible to cure the whites. When, however, the catarrh proves itself to be independent and chronic, il must be attacked in a direct manner; and among the most powerful local remedies (all of which I cannot of course give here) is the inward ascending douche while in the chalybeate bath.

When the whites are themselves caused by chlorosis or some other form of poverty of the blood, the general mode of treatment of this disorder of the blood by means of the inward and outward application of the chalybeate waters is to be observed as the principal thing. And this method is also to be employed in such cases in which the whites, on the other hand, have been the cause of an impoverishing of the blood and a deterioration of the whole constitution, as also of many different disorders of the nerves.

b. Hemorrhage. Of course it needs not be mentioned that there are a great many cases of hemorrhage from the matrix that require no treatment with the waters of Pyrmont. It is also evident that in cases of hemorrhage caused by cancer, polypes, &c., the waters of Pyrmont can avail nothing. But there are other sorts of hemor-

rhage from the matrix for which they prove very efficacious. Such are those in which the cause is to be sought in a too watery state of the blood. Although in most cases of chlorosis the monthly courses are too weak, occur too seldom, and the discharge of blood is but scant, there are yet a not inconsiderable number of females suffering from chlorosis who have their courses too often and lose a comparatively large quantity of blood through them. Now it is the duty of the doctor in such cases to assure himself as to whether some local affection may or may not be the cause. There are, however, many such cases in which no such local affection is present, and the only assignable cause is poverty of the blood. We are not able as yet to fully explain why poverty of the blood causes now a scanty flow of blood, now an ample one.

There are other cases in which the hemorrhage proceeds from a similar cause to that given above, and they are also successfully treated at Pyrmont; I mean hemorrhages which occur with females between the 43rd. and 50th. year of life, a period in which the courses generally cease. And all these hemorrhages are hurtful to the body, because they move ever in one circle. Namely, the greater the poverty of blood, the more violent is the hemorrhage; and the greater the loss of blood, the more intensive is the degree attained by the poverty of the blood. And it is just this dangerous state of things which is changed by the waters of Pyrmont: the hemorrhages are stayed and the poverty of blood eradicated. The chalybeate baths should, in these cases, be taken as cool as possible; and in addition, as auxiliary remedies, in many cases cool sitting baths and the use of the cold

ascending douche. The employment of these latter remedies, however, should always be dependent upon a careful consideration on the part of the doctor of all individual circumstances.

Where it is proved that some swelling of the milt or liver, or other like causes, by disturbing the backward flow of the blood, co-operate in producing the hemorrhages, the patient should first drink of the dissolving saline waters alone, or a mixture of these and the chalybeate waters. I must, however, confine myself to these general hints on the treatment of hemorrhage from the matrix with the waters of our springs. Anything more in detail is to be judged by the doctor in special cases.

c. Chronic Inflammation of the Womb. This complaint is the common point of contact of all chronic diseases of the matrix, and the principal object of all recent discoveries in this department. Want of room prevents my enlarging here upon this subject, and I will therefore confine myself to a few short remarks in reference more especially to the means of treating this complaint at our disposal here in Pyrmont.

In the first place we must observe that this complaint, which generally requires a very long healing process, displays in the course of time two phases distinctly different in their nature. In the first period of its existence the matrix, which is more or less swollen in its whole bulk, displays a considerable superabundance of blood and a saturating dampness of its tissue; at a subsequent period of its existence just the contrary is observed. As a matter of course, therefore, the treatment in the two phases must differ in the same degree. In

the first period, in which the local symptoms observed by the patient, viz. a feeling of oppression in the abdomen, a pain in the loins often stretching down as far as the thigh, &c., indicate plainly the formation of a congestion in these parts — in this phase, I say, some process must be employed for reducing the inflammation. Here, besides local bloodletting, the inward application of the saline waters for some weeks produces a most beneficial effect, and the more as patients of this category generally suffer from constipation. And for the stopping of the process of inflammation, and the rendering fluid and carrying off of the product of the inflammation, there is scarcely a more powerful agent than the saline baths: in recent cases I should recommend the weaker saline baths, and for those having a tendency to the second phase the more powerfully operating saline baths impregnated with iron and brom: for such cases the waters of our New Saline Spring are beyond all praise. But in undisputed cases of the second category, in which not only the swollen matrix indicates a local poverty of blood, and generally produces but a scanty course, but also, in consequence of the long sickliness, poverty of blood in general, with all its consequences, shows itself in the nervous system by different phases of hysteria, the chalybeate waters, inwardly and outwardly applied, are the best remedies. Under certain circumstances one can employ with advantage now sitting baths, now inward *douches*, the temperature of which must be suited to the state of irritability. It is often advisable for the patient, after having taken the saline waters, to employ a mixture of the saline and chalybeate waters, before proceeding to take the chalybeate waters alone. It

cannot, however, be my intention to enlarge here upon the treatment of each single consecutive phase and accompanying symptom, such as catarrh, different sorts of ulcers, &c., &c. I will only remark that ladies coming to Pyrmont will find in the doctors of the place the necessary acquaintance with the subject and the requisite experience and practice in the mode of treatment.

d. Sterility and Proneness to Abortion. The indisputable fact (and one observed annually in numbers of cases), that after years of sterility females become *enceinte* after a season at Pyrmont is explained by the action of the chalybeate waters in removing certain complaints, partly of a general and partly of a local nature, which till then had effectually hindered conception. As such a complaint we may mention chlorosis: and it is a fact confirmed by daily experience that females suffering from chlorosis do not easily become *enceinte.* But we are not able to explain this physiologically with certainly and precision. As we see, however, that chlorosis exercises a decided influence on the courses; and as we know, further, that the courses are in intimate relation to the state of maturity of the ova, the conclusion can scarcely be termed a bold one, which supposes that this process of development is disturbed by chlorosis, and that this is mostly the cause why pregnancy so often fails to take place in the case of chlorotic females. And so we very often see that the employment of the chalybeate waters of Pyrmont not only cures the patient of chlorosis, but also produces the often long-desired result — pregnancy.

Another perhaps still more important influence tending to prevent pregnancy is exercised by the above-mentioned

local affections, among which are the catarrh appearing under the form of leucorrhæa and the chronic inflammation of the matrix (already treated of). Among the many different local circumstances that exercise an influence in this matter, I will speak of one only; namely, in these cases the mucous membrane, to which the ovum should attach itself for further development, is in an abnormal condition, whereby this attaching process is seriously disturbed.

These brief remarks must suffice here; and I will only add, that the same circumstances must be taken into consideration in judging of that proneness to *fausse couche* so often observable under such circumstances. But there is still a circumstance which is worthy of mention here; namely, that the general excitability displayed by poor-blooded, nervous females, together with local irritability caused by the processes of inflammation, too easily combine to induce a premature contraction of the muscles of the matrix, and as a natural consequence the premature delivery of the child. As we have already shown that chlorosis, poor-bloodedness, and nervous oversensitiveness, as also local affections like catarrh and chronic inflammation of the matrix, are removed by a proper application of the waters of Pyrmont, it is evident that both sterility and a proneness to abortion may also be cured by their aid.

The readers of these remarks will now reasonably expect me to mention whether females in a state of pregnancy should take the waters of Pyrmont, and if so, to what extent. As conscientious answer to this question I can only say, that in the seven years I have acted as physician here at Pyrmont — although I have had every

year a not inconsiderable number of pregnant females under my care — there have been but two cases of abortion among my patients, and that they both times were quite independent of the effects of the waters. I therefore most emphatically deny that, with proper caution, *fausses couches* are particularly liable to take place here. In drinking the chalybeate waters the patient must not take too large quantities, and she will then prevent the absorption of a too large amount of carbonic acid; and in bathing in chalybeate water she should not do so daily, but every other day, or two days out of three; the duration of the bath should be from a quarter of an hour to twenty minutes only; and strong inward douches should not be employed at all in such cases.

The symptoms indicating when it would be advisable to have recourse to the waters of Pyrmont during pregnancy are partly found in the above-mentioned general state of the body: when, for instance the poor-bloodedness has attained such a degree that it appears somewhat dangerous to put off the taking of the water till after delivery. The advantages derived from the taking of the waters are not confined to the mother; they are partaken of by the child also; for we have often had cases in which females of weak and chlorotic natures, who till then had always had only very weak children, whose lives were always in danger, have, after taking the chalybeate waters, given birth to sound and healthy ones. Finally, females with a proneness to abortion should call in the physician and ask his advice, as to whether it would not be advisable to try the waters of Pyrmont.

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